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TAC MAINTENANCE OFFICERS:
TECHNICAL OR ADMINISTRATIVE SPECIALISTS?

THESIS

Nancy E. Frye
Captain, USAF

AFTT/GLM/LSM/88S-22

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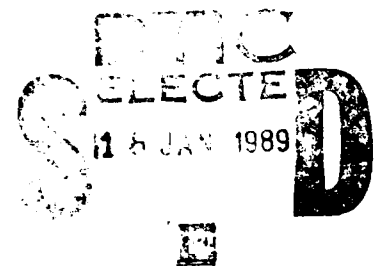
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THESIS

Presented to the Faculty of the School of
Systems and Logistics
of the Air Force Institute of Technology
Air University

In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Logistics Management

Nancy E. Frye, B.S.
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September 1988

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Abstract

The purpose of this study was to examine whether wing level maintenance supervisory personnel in Tactical Air Command (TAC) preferred branch level maintenance officers to be more administratively or technically oriented. Though maintenance officers need both technical and administrative skills to successfully accomplish their assigned duties, it was felt most supervisors express a distinct preference for one of these skills over the other. The wing level maintenance supervisors studied included both commissioned officers holding positions superior to the branch level maintenance office and subordinate enlisted maintenance managers. Six groups were included in the study. These groups were Deputy Commanders for Maintenance, Squadron Commanders, Maintenance Supervisors, Maintenance Superintendents, Branch Chiefs, and Shop Chiefs.

A survey was developed expressly for this investigation and sent to a random sample of maintenance supervisors in TAC. Three main investigative questions were addressed. First, each of the six different groups of respondents were studied individually to determine what skills each preferred. Second, the superior and subordinate subgroupings were examined to identify any preferences for technical or administrative talents. Lastly, all responses

were analyzed together to see what talents TAC maintenance supervisors preferred overall.

Analysis of the responses indicated the Deputy Commanders for Maintenance held the strongest opinions and definitely preferred maintenance officers to possess technical skills. The Squadron Commanders and Maintenance Supervisors also preferred technical over administrative skills. No preference for either technical or administrative abilities was expressed by the Maintenance Superintendents, Branch Chiefs, or Shop Chiefs.

Examination of each of the two main subgroups showed the subordinate group preferred both skills equally, while the superior group exhibited a clear preference for technical skills. When all responses were analyzed together, the overall results indicated that TAC wing level maintenance supervisory personnel prefer the branch level maintenance officer to be more technically than administratively adept.

The results of this study supported previous work in the area of perceptions of managerial effectiveness throughout an organization. Overall, research in this area shows that different groups within an organization have different perceptions of effective managerial behavior. Additionally, groups further apart in the organization will tend to show more divergent attitudes.

TAC MAINTENANCE OFFICERS:
TECHNICAL OR ADMINISTRATIVE SPECIALISTS?

I. Introduction

Problem Statement

The field of aircraft maintenance is complex and the officers assigned to manage aircraft maintenance activities have demanding jobs. AFR 36-1 lists the official duties of those managers, the aircraft maintenance officer. The various tasks identified by this regulation can be broadly broken down into two major categories of technical and administrative duties.

In order to effectively perform their jobs, aircraft maintenance officers must possess both technical and administrative skills in varying degrees. The specific job, location, or local policies may make either of these skills more valuable for the maintenance officer to possess. Additionally, the wing level maintenance officer works with both enlisted and commissioned maintenance supervisors. These supervisors all have their own opinion as to what emphasis should be placed on these two different skills. These preferences probably have the greatest impact on determining whether technical or administrative abilities are more important to possess.

Based on both the experience of the author and informal discussions with several other maintenance officers, it appears the various wing level maintenance supervisors prefer maintenance officers to be stronger in either the technical or administrative area. The preference is not mutually exclusive. However, there appears to be a definite inclination towards favoring one of these two types of skills.

For maintenance officers to effectively do their jobs, it is essential they know what skills both their superior officers and the subordinate enlisted maintenance supervisors prefer. Until now, this information had never been formally identified. This research was the first effort to distinguish whether the supervisors prefer technical or administrative skills.

Purpose of the Study

Wing level maintenance supervisors in Tactical Air Command (TAC) appear to prefer maintenance officers to possess technical and administrative skills in differing degrees. To identify which of these skills the supervisors prefer, several investigative questions were addressed.

Investigative Questions. The investigative questions were as follows:

1. Do the six different subgroups of maintenance supervisory personnel prefer a more technically or administratively oriented maintenance officer and is there

any difference between the groups? These groups are the supervisors of the maintenance officer which are the Deputy Commanders for Maintenance, Squadron Commanders, and Maintenance Supervisors and the enlisted managers who are subordinate to the maintenance officer which are the Maintenance Superintendents, Branch Chiefs, and Shop Chiefs.

2. What level of expertise do the commissioned officers (superiors) and the enlisted supervisors (subordinates) prefer a maintenance officer to possess in each of the technical and administrative areas and do the preferences differ?

3. When both the commissioned and noncommissioned officers are viewed as one group, do TAC wing level maintenance supervisors prefer a more administratively or technically oriented maintenance officer?

4. Does the length of time the respondent has spent in TAC influence the preference for technical or administrative skills?

Figure 1 depicts the different groups that were investigated.

Hypotheses. In response to the investigative questions, the following results were hypothesized.

1. Each of the individual subgroups would show a distinct preference for one of the two different skills. The superior subgroups would prefer a slightly more administratively oriented maintenance officer as would the

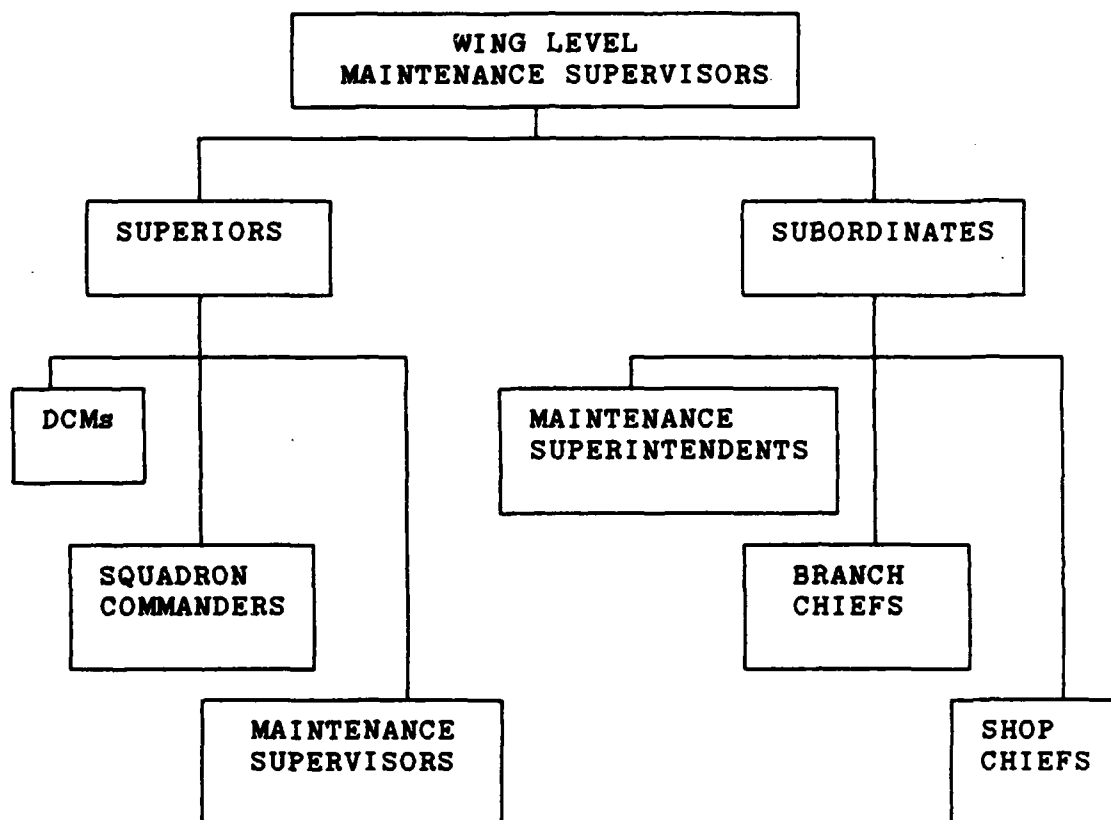


Figure 1. Investigative Levels

Maintenance Superintendent subgroup. The two remaining subordinate subgroups, Branch and Shop Chiefs, would prefer a more technically oriented officer. Additionally, the difference in opinions would be more pronounced the further any two subgroups were apart in the chain of command.

2. The commissioned officers would prefer a slightly more administratively oriented maintenance officer, while the enlisted supervisors would strongly prefer maintenance officers to be more technically oriented.

3. When considered as one group, TAC wing level maintenance supervisors would prefer a more technically oriented maintenance officer.

4. The length of time spent in the command would have a distinct influence on the choices made. Respondents with more than three years in TAC would answer as predicted by Hypotheses 1, 2 and 3. Those individuals with less than three years in the command would respond in a variety of ways with no particular pattern. Therefore, the preference for technical or administrative skills would be partially dependent on the experiences the respondent had as a member of TAC.

Definition of Terms

For the purpose of this research, the following definitions were used:

Technical Duties. Those duties directly involved with the production effort of aircraft maintenance.

Administrative Duties. Those duties involved with keeping the maintenance organization functioning.

Maintenance Supervisors. All commissioned and noncommissioned officers serving in the positions of Deputy Commander for Maintenance, Squadron Commander, Maintenance Supervisor, Maintenance Superintendent, Branch Chief, and Shop Chief.

Branch Level Maintenance Officer. Any commissioned officer serving as the Officer in Charge of a maintenance branch or Aircraft Maintenance Unit.

Scope

This research was limited to determining whether TAC wing level maintenance supervisors prefer branch level maintenance officers to possess technical or administrative skills. The identical issue was analyzed by two other researchers for Strategic Air Command (AFIT/GLM/LSM/88S-21) and Military Airlift Command (AFIT/GLM/LSM/88S-58).

Summary

The varied tasks and different expectations of performance by superiors and subordinates create a challenging work environment for the aircraft maintenance officer. This thesis determined the level of emphasis maintenance officers should place on administrative and technical skills to best perform their jobs. The next chapter presents a literature review to orient the reader

further to the background of the issue of whether TAC wing level maintenance supervisors prefer maintenance officers to be more administratively or technically oriented.

II. Literature Review

Introduction

A review of literature was accomplished to determine what past research has been done and to derive background information on the subject. The background information is presented first to acquaint the reader to the maintenance environment in TAC. After that, previous research on perceptions of effective performance is summarized. This research was applicable in determining whether TAC maintenance supervisory personnel prefer branch level maintenance officers to possess technical or administrative skills.

Background

Duties of Maintenance Officers. The duties of an aircraft maintenance officer are varied and complex. As Brigadier General Nutt stated, "Few people in the Air Force work harder or under greater demands than maintenance people" (14:56). According to AFR 36-1, the primary duties and responsibilities of a maintenance officer include:

- a. Planning and organizing aircraft maintenance functions.
- b. Directing aircraft maintenance activities.
- c. Coordinating aircraft maintenance activities.
- d. Supervising technical aircraft maintenance functions (4:Atch 13,15).

These responsibilities can be broadly divided into technical

and administrative duties. Technical duties include tasks such as establishing work priorities, troubleshooting aircraft malfunctions, and reviewing completed maintenance actions for quality and compliance with technical directives. The technical duties are production oriented. Administrative duties include briefing supervisors on the status of aircraft, writing various reports such as Airman Performance Reports, and attending meetings. The primary focus of administrative duties is on people. The duties of a maintenance officer encompass both the technical and administrative areas. "There is a critical demand for technically competent individuals who are highly skilled at dealing with people and people problems" (10:1). The maintenance officer is officially expected to perform all of these duties equally well.

Even though the ideal maintenance officer should be highly skilled in both technical and administrative areas, supervisors recognize not all maintenance officers will meet these requirements. Additionally, the supervisors have distinct preferences favoring technical or administrative skills. The primary purpose of this research was to determine if wing level maintenance supervisory personnel prefer maintenance officers to be more skilled in either administrative or technical abilities.

TAC Maintenance Concept. TAC maintenance operates as a Combat Oriented Maintenance Organization (COMO). It is

commonly referred to as a decentralized maintenance concept (1:34). Decision making authority and control of maintenance actions are placed in the hands of the direct sortie producing organization known as the Aircraft Maintenance Unit (AMU). This is in direct contrast to a centralized concept where the staff of the Deputy Commander for Maintenance has this authority (9:298). In TAC, the flying squadron and dedicated AMU contain the people who fly the aircraft and those who work together to support the squadron operations. This organization trains and works together as a unit just like it would in wartime. As a result, the tactical fighter squadron is more productive in peacetime and has the added benefit of being prepared to function on its own during wartime (2:66).

Under COMO, the majority of aircraft maintenance functions are consolidated in the AMU (13:26). Each AMU consists of a dedicated team of maintenance people with all the necessary skills required to support one flying squadron. It is a self contained unit with everything from weapon specialists, system specialists (i.e. hydraulics and engines), and generalists known as crew chiefs. Supply specialists are also assigned to this maintenance organization.

The typical wing level maintenance organization, shown in Figure 2, consists of three squadrons, a staff function,

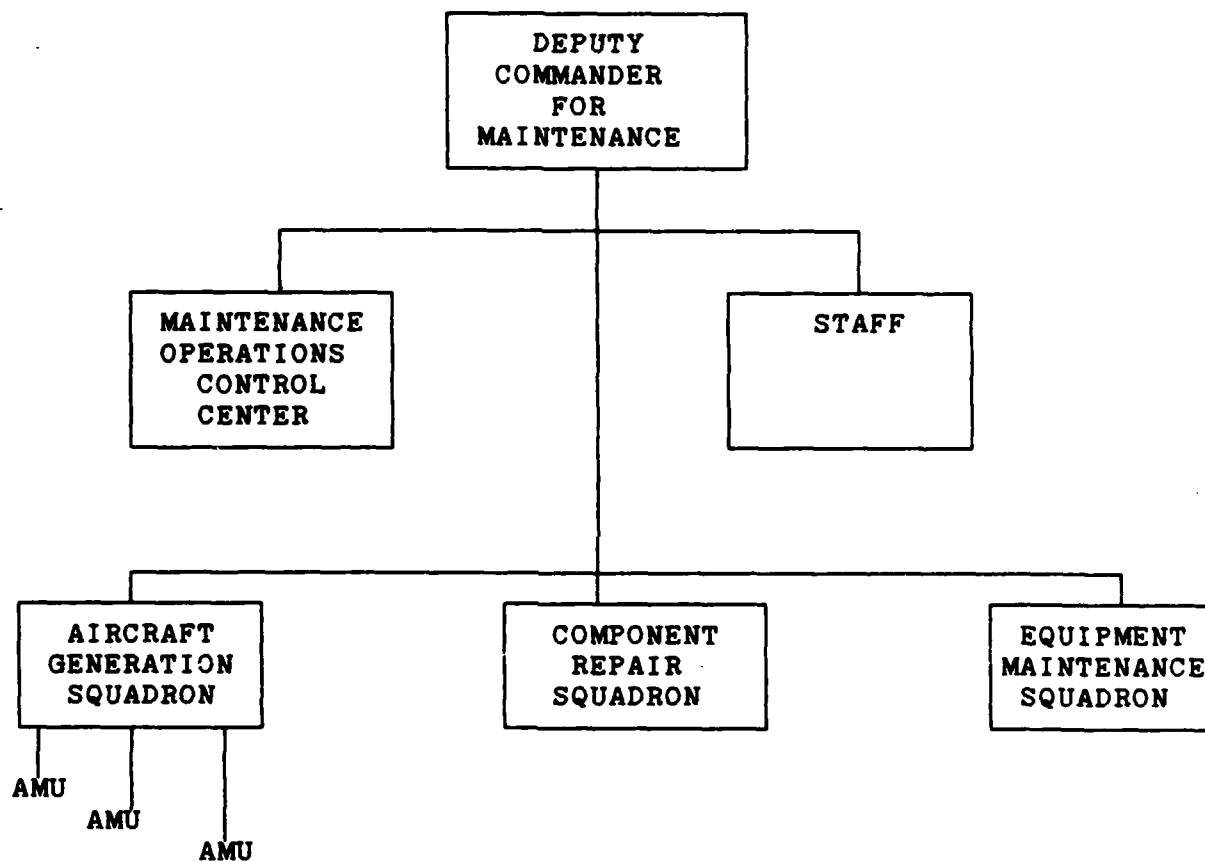


Figure 2. TAC Maintenance Organization
(3:1-6)

and a maintenance operations control center working directly for the Deputy Commander for Maintenance.

The direct sortie producing element consists of the Aircraft Generation Squadron while the indirect sortie producing element is composed of both the Component Repair Squadron and Equipment Maintenance Squadron [9:300].

The AMUs are located within the Aircraft Generation Squadron and are the focus of all maintenance activities.

Environment of the Branch Level Maintenance Officer.

Branch level maintenance officers work with two distinct levels of management within the maintenance complex. The first group consists of their superiors. This includes the Maintenance Supervisor, the Squadron Commander and the Deputy Commander for Maintenance. These people are in the direct chain of command of the branch level maintenance officer. The second group of managers are the enlisted supervisors who are subordinate to the maintenance officer. The Maintenance Superintendents, Branch Chiefs, and Shop Chiefs comprise this group.

Expectations of Performance. Various studies have been made analyzing the perceived effectiveness of managers. These studies support the theory that different groups comprising the manager's work environment tend to have different expectations and therefore different definitions of effective behavior. Additionally, research has shown the further apart two groups are in the hierarchy of an organization, the more divergent will be their expectations.

A manager's effectiveness depends on the expectations of the various groups which are part of the manager's environment. As previously explained, the wing level maintenance officer works in a complex environment. Tsui and Milkovich view such an organization to be comprised of multiple constituencies. In other words, the organization is a system composed of interdependent groups of people (16:521). According to Tsui and Milkovich:

Constituents' expectations are directly derived from their roles or functional responsibilities, their unique positions in the organizational hierarchy, or their career and personal circumstances [16:522].

For example, supervisors may be more concerned about how well the manager is achieving business objectives while subordinates may be more concerned with how well their personal and career needs are being met by the manager's actions (16:522). The same potential difference in constituency expectations exists in the maintenance organization. This means the maintenance officer must balance the competing demands of superiors and subordinates to be viewed as successful by both groups.

Other research by Tsui supports this contention. She set out to determine if different constituencies use different criteria to judge a manager's performance. Two of the primary role sets or constituents she identified were superiors and subordinates. She stated that focal managers are judged to be effective by how well their job skills match what the various role sets expect (15:65). Her

research showed effectiveness criteria were indeed dissimilar between the different constituencies (15:82). The most effective manager was the one who was best able to balance the demands of the various work groups (15:66). A maintenance officer's effectiveness is also based on how well that person balances the various demands by the supervisors and subordinates for technical and administrative skills.

Several other researchers concluded supervisory and subordinate groups often have different expectations of the manager. Latham, Fay, and Saari stated supervisors and subordinates frequently define effective managerial behavior differently. They feel effectiveness is defined by the behavior each observer or group wants to see from all incumbents in a similar position (8:300). Therefore, each supervisor and subordinate group in this study can be expected to define effective management somewhat differently. According to Tsui, "Previous research has suggested that superiors place different demands on managers than do subordinates" (15:67). Each of the six constituency in this study may also report differing opinions as to whether a maintenance officer should possess technical or administrative skills.

Landy and Farr also report low to moderate correlations are expected when comparing different groups of people who rate an individual's performance (7:78). Therefore,

different levels of maintenance supervisors will most likely consider different skills to be more important when judging the performance of a maintenance officer. This indicates how important it is for managers, including maintenance officers, to clearly understand what is expected of them from their superiors and subordinates.

Superiors and subordinates were shown to influence the behavior of supervisors in a study by Pfeffer and Salancik. They found the behavior of the supervisor was constrained by the demands of the various groups in the work environment. They surveyed 53 first-level supervisors using a Leader Behavior Descriptive Questionnaire. They discovered almost one quarter of the variation in supervisory behavior was a result of the different expectations of superiors and subordinates (12:139-149). This additional research indicated superiors and subordinates do have different influences on a manager and different performance expectations.

Research has also been done that shows the differences in expectations not only vary between superiors and subordinates but that the expectations are more widely varied the further apart two groups are in the organizations hierarchy.

One such study was done by Tsui and Milkovich. They sought to prove the greatest difference in preference would be between the two extremes of line executives and non-

management employees. Additionally, they hypothesized that agreement on the activities desired for effective performance would be low for organizations with highly heterogeneous constituencies (16:522). As a result of their research, they determined:

The largest differences were between the two constituencies most distant in the organization hierarchy. The preferences of the one in the middle tended to be most similar to those above and below them (16:534).

The maintenance supervisory personnel are a heterogeneous group. These people vary in rank from Sergeant to Colonel, have varying degrees of experience, and have different responsibilities. Therefore, in addition to determining if the maintenance supervisors prefer administrative or technical skills, this study expected to show the preferences differ more the further apart the groups are in the hierarchy.

Summary

A branch level aircraft maintenance officer has a demanding job. It requires the maintenance officer to possess both technical and administrative skills to effectively do the job. While it would be desirable to have an officer with equally excellent administrative and technical skills, this is seldom possible. Additionally, supervisory personnel tend to prefer a maintenance officer to possess one of these two skills over the other.

Because TAC maintenance is decentralized, wing level maintenance officers are given a lot of responsibility and authority early in their careers. The maintenance supervisors, both superiors and subordinates to these people, have different expectations of what constitutes effective behavior. Research in the behavioral sciences has resulted in the conclusions that superiors and subordinate have different expectations of managers and these expectations differ more the further apart the constituencies are in the hierarchy of the organization.

The next chapter addresses the methodology used to determine if TAC maintenance supervisory personnel prefer more administratively or technically oriented maintenance officers and what differences lie between the six subgroups comprising the overall group of supervisory personnel.

III. Methodology

Introduction

This chapter presents the research methodology used to determine if TAC wing level maintenance supervisors prefer aircraft maintenance officers to be more technically or administratively oriented. First the data gathering plan will be addressed. After that, the plan for analyzing the data will be presented. Finally, possible uses of the information will be covered.

Data Gathering Plan

Data Collection Instrument. The primary data collection instrument used was a survey. The key strength of a survey is its usefulness for gathering information about attitudes and opinions (4:158). Since this research was interested in the attitudes and opinions of maintenance supervisors, a survey was the appropriate instrument to use. It was assumed the military members responding to this survey would truthfully answer the questions.

Because no survey existed to measure technical versus administrative preferences, one was developed. The survey is presented in Appendix A. The first eight questions ask the respondents demographic questions for comparison purposes. The core of the survey consists of 57 questions which determine specific traits the respondents prefer in a maintenance officer. Responses from the returned surveys were analyzed to determine if the respondents preferred a

more technical or administrative maintenance officer. A description of the questions and data types is listed in Table 1.

TABLE 1
QUESTION DESCRIPTION AND DATA TYPE

SURVEY SECTION	QUESTION NUMBERS	QUESTION DESCRIPTION	DATA TYPE
ONE	1-8	DEMOGRAPHICS	NOMINAL
TWO	9-13	FORCED CHOICE	NOMINAL
THREE	14-16	MULTIPLE CHOICE	NOMINAL
FOUR	17-38	RANK CHOICE	ORDINAL
FIVE	39-48	5 POINT SCALE	INTERVAL
SIX	49-59	FORCED CHOICE	NOMINAL
SEVEN	60-61	MULTIPLE CHOICE	NOMINAL
EIGHT	62-65	5 POINT SCALE	INTERVAL

The survey instrument was designed to also be used by researchers looking at similar issues in both Strategic Air Command and Military Airlift Command. Therefore, some sections of the survey and particular questions were not used in this research. The questions analyzed are listed in Table 2.

TABLE 2
SURVEY QUESTIONS ANALYZED

SECTION	QUESTION NUMBERS
ONE	1, 2, 4-7
TWO	9-13
THREE	14-16
FOUR	17-32
FIVE	39-48
SEVEN	61
EIGHT	62, 63, and 65

Validation of Survey. The survey instrument was validated by personnel from the 4950th Test Wing at Wright-Patterson AFB, OH. A random sample of eighteen aircraft maintenance supervisors, both commissioned officers and enlisted managers, completed the survey. The DCM, Squadron Commander, Maintenance Supervisor, and Maintenance Superintendent levels were surveyed completely. Due to the large number of Branch and Shop Chiefs, a sample of four Branch Chiefs and five Shop Chiefs was selected. This was chosen in the same manner the final survey sample was selected. All positions were listed and a random number generator was used to choose the test sample.

The random sample of respondents from the 4950th Wing was representative of the research sample and population. According to Fowler, pretesting a self-administered survey

provides information on the distribution of expected responses. The pretest is more useful if the people taking it are also allowed to make comments about the survey (5:105). This opportunity was offered to the test group. Based on their responses and comments, changes were made to clarify and improve the survey.

Population. The research population consisted of all wing level maintenance supervisors in TAC's Ninth and Twelfth Air Forces. HQ TAC/LGQ provided a list of these 23 wings (Appendix B). The supervisors included all Shop Chiefs, Branch Chiefs, Maintenance Superintendents, Maintenance Supervisors, Squadron Commanders, Assistant Deputy Commanders for Maintenance, and Deputy Commanders for Maintenance (DCM). The population size was estimated at 1541. The population and sample sizes are shown in Table 3.

Inferences about the Population. Inferences were made from the sample concerning only TAC wing level maintenance supervisors. The entire population of TAC maintenance supervisors would also include those supervisors in First Air Force. This group was not included in the population studied due to its small size and non-standard organizational structure from wing to wing.

Sample. The total sample size was 296. This sample size was chosen based on recommendations found in the literature. Several sources indicated a primary reason for selecting a sample size is to determine what subgroups will

TABLE 3
POPULATION AND SAMPLE SIZES

GROUP	POPULATION SIZE	SAMPLE SIZE
DCM	46	46
SQUADRON COMMANDERS	69	50
MAINTENANCE SUPERVISORS	69	50
MAINTENANCE SUPERINTENDENTS	69	50
BRANCH CHIEFS	322	50
SHOP CHIEFS	966	50
TOTAL	1541	296

be analyzed and how large those groups must be for the research purposes (5:42,11:296). A sample size of 50 was taken from five of the six groups including the Shop Chiefs, Branch Chiefs, Maintenance Superintendents, Maintenance Supervisors, and Squadron Commanders. This was deemed adequate for analysis purposes if approximately 60 percent or more of the people contacted returned the survey. Also, these sample sizes were selected to keep each of the individual group samples about equal in size. The Assistant DCMs and DCMs were combined into one group for analysis. Due to the small size of the population, all 46 members were surveyed.

Sample Selection. Simple random selection was used to choose the sample. The population was first stratified into the six distinct groups. This was done to ensure the sample

had as near an equal number of people in each of the subgroups being analyzed (11:226-228,4:307). The entire population for each group was then listed on a spreadsheet and a random number generator was used to select the sample. After the sample was generated, each wing was contacted to ensure the position identified did exist at that wing. Each wing may be organized differently and in some cases, shops may be combined or shared with other wings. If a particular organization did not exist, it was removed from the sample list and the next random choice was added to it. Appendix C contains a list of the sample selected for each subgroup.

Collection Technique. Questionnaires were distributed by duty title to the sample members through their parent wings. The individual respondents returned the completed surveys through the mail. Surveys were coded to identify where they were sent. This information was to be used to follow up if less than 60% of the surveys were returned. Respondents were asked to return both the survey itself and the coded answer sheet. This allowed the researcher to make a spot check on the accuracy of the answer sheet and to check if coding errors were made. This was particularly useful as a check for suspected outliers.

Data Analysis Plan

Standard descriptive statistical methods were used to evaluate the data and answer the investigative questions. Since, most of the data collected was nominal, it was

examined using nonparametric testing. The ordinal data from section four of the survey was planned to be analyzed using parametric testing if it proved representative of the entire survey. According to Emory, controversy surrounds the use of parametric testing on ordinal data. However, many scientists support using parametric testing on both practical and theoretical grounds (4:90). The data in section five was considered to be interval due to the nature of the questions. While there is some discussion as to whether attitude scales can be considered interval, there is support for the contention that they are (5:85-86). Emory states, "...whether a particular scale is interval or ordinal is often a matter of judgement" (4:91). The interval data was also planned to be studied using parametric testing contingent on it being representative of the rest of the survey.

In order to use parametric testing on sections four and five to make inferences about all responses on the survey, the first step was to test for internal validity between the main body of the survey and those two sections. The test was:

H₀: There is no difference in the selection of technical and administrative skills between the sections of the survey.

H_A: There is a difference in the selection of

technical and administrative skills between the sections of the survey.

A contingency table using the chi-squared statistic was used to determine if there was a statistical difference in responses between the sections. If there was no difference, sections four and five would then be used to make inferences about the entire survey.

Additionally, descriptive statistics were used to summarize all of the raw data. The data was first combined in nominal form. Then various relative frequency histograms were developed to analyze the results.

The different groups were also compared using nonparametric testing. Several different tests were used.

A one-sample test was used on individual groups to determine if there was a preference for either administrative or technical skills. That test was:

H_0 : There is no difference in the selection of technical and administrative skills by an individual group.

H_A : There is a difference in the selection of technical and administrative skills by an individual group.

The expected values were determined by assuming half of the responses would be administrative and half would be technical if there was no difference in the selection rate.

A two-sample contingency test was used to determine if there were differences in the responses between two groups. The format of that test was:

H₀: There is no difference in the selection of technical and administrative skills between two individual groups.

H_a: There is a difference in the selection of technical and administrative skills between two individual groups.

To determine if there were differences in the responses between the subgroups comprising the subordinate and superior group, a three-sample contingency table was used. That test was:

H₀: There is no difference in the selection of technical and administrative skills between the three subgroups in the superior (subordinate) group.

H_a: There is a difference in the selection of technical and administrative skills between the three subgroups in the superior (subordinate) group.

Finally, a six-sample contingency table was used to compare all of the subgroups together. The purpose was to determine if there was a difference between any of the six subgroups. The format of that test was:

H₀: There is no difference in the selection of

technical and administrative skills between any of the subgroups in the sample.

H_a: There is a difference in the selection of technical and administrative skills between any of the subgroups.

Table 4 lists the various contingency table tests and rejection regions or critical chi-squared values for these tests. Any test statistic greater than the chi-squared value led to the rejection of the null hypothesis. All tests were done at a 95 percent confidence level.

TABLE 4
CONTINGENCY TABLE TESTS AT 95% CONFIDENCE LEVEL

TEST	DEGREES OF FREEDOM	CHI-SQUARED STATISTIC
INTERNAL VALIDITY	4	9.49
PREFERENCE OF ONE GROUP'S RESPONSE (ONE-SAMPLE TEST)	1	3.84
TEST FOR DIFFERENCE BETWEEN TWO GROUPS (TWO-SAMPLE TEST)	1	3.84
TEST FOR DIFFERENCE BETWEEN THREE GROUPS (THREE-SAMPLE TEST)	2	5.99
TEST FOR DIFFERENCE BETWEEN THE GROUPS (SIX-SAMPLE TEST)	5	11.07

Investigative Question 1. Each of the six subgroups were examined individually to determine whether the subgroup had a preference for technical or administrative skills and to see what that preference was. Each group was also compared to the other groups to see if there were any differences between them.

The individual examinations consisted of first inspecting the relative frequencies of technical and administrative responses for the group. Then, a one-sample contingency table test was performed to determine if there was a statistically significant difference between the rate of selection of administrative and technical answers. These two analyses allowed the researcher to determine the preference of each individual group.

The six groups were then compared to each other using the six-sample contingency table test. If the test showed a significant difference existed between the groups, then each group would be compared to each other one at a time. Nonparametric methods were used to determine if there was a difference between any two groups and where those differences existed. The two-sample contingency table was the nonparametric test used.

Investigative Question 2. This question examined both the superior and subordinate groups individually and then compared them. Two issues were examined. The first concern was to see if the two groups had a preference for technical

or administrative skills. The second was to see if there was a difference between the preferences of the two groups.

The individual examinations consisted of first inspecting the relative frequency histograms for each group. Then, the three-sample contingency table test was performed for both groups to determine if there was a statistically significant difference within each of them. Together, the tests indicated the preferences for both groups.

The comparison of the groups was made by looking first at the histograms depicting the frequency of the two groups' technical and administrative responses. After this comparison was made, the two-sample contingency table test was used to determine if there were statistically significant differences between the two groups.

Investigative Question 3. This question addressed TAC maintenance supervisors as one group and was examined in two ways. First, relative frequency histograms summarized all of the data to indicate the overall preferences of all respondents. Second, nonparametric testing using a one-sample contingency table was used to determine if there was a statistical difference between the preference for technical or administrative skills. These tests allowed the researcher to determine whether the population preferred technical or administrative skills.

Investigative Question 4. This question looked at whether there was a difference between the responses from

those individuals with less than three years in TAC and those with more than three years in the command. Relative frequency histograms would be examined and two-sample contingency tables would be used to test if there was a difference between the two groups.

Additional Analyses. The following additional analyses were performed.

1. Question 16 was examined separately and the relative frequencies of responses were analyzed. Three different groups were compared. These were the entire group of respondents, the officers, and the enlisted members.
2. Questions 62, 63, and 65 were examined for the same three groups. Relative frequencies and means for each question were calculated. This was used to determine what qualities the respondents said they desired and to see if this matched the results of their responses to the rest of the survey.

Use of Results

These findings have two primary uses. First, maintenance officers in TAC can use the information to determine what skills are preferred by both their supervisors and subordinates. This knowledge can help them balance the various expectations and do their jobs more successfully. These findings can also serve as a building block for further research. The results could be compared to data collected from SAC and MAC. This comparison would

identify similarities and differences among the three major commands. The information could then be used to define job prerequisites and to make decisions on officer training requirements.

Summary

This chapter outlined the basic methodology used to test the hypotheses of this research. A survey was developed to determine if maintenance supervisory personnel prefer more technical or administratively oriented maintenance officers. The survey was tested and sent to a sample of maintenance supervisory personnel. The analysis plan for the data collected was described in detail. Descriptive statistics and a combination of parametric and nonparametric testing was planned to be used in the analysis of the data. The next chapter presents the actual analysis of the data.

IV. Research Results

Introduction

This chapter will present the results and findings of the analysis of whether TAC wing level maintenance supervisors prefer a more administratively or technically oriented maintenance officer. The data acquired from the returned surveys was analyzed in order to answer the investigative questions posed. The statistical analyses were performed using a combination of the SAS statistical package and a spreadsheet application.

This chapter will first address the demographics of the returned surveys in order to acquaint the reader with the sample studied. Next, the results of the tests for internal validity will be presented. Problems identified with the survey will then be addressed. Finally, each of the investigative questions will be looked at individually.

Demographics

Overall, 70% of the surveys sent out were returned and could be used in the analysis. The smallest number of respondents were in the Branch Chief subgroup which had a 54% return rate, while the Maintenance Supervisor subgroup had the largest return rate at 88%. Table 5 summarizes the return rates for each group.

A general picture of the background and experience of the respondents is depicted in Figures 3 through 8. Figure

TABLE 5
NUMBER/PERCENT OF SURVEYS RETURNED

GROUP	NUMBER OF SURVEYS RETURNED	PERCENT OF SURVEYS RETURNED (%)
DCMs	36	78
SQUADRON COMMANDERS	38	76
MAINTENANCE SUPERVISORS	44	88
MAINTENANCE SUPERINTENDENTS	32	64
BRANCH CHIEFS	27	54
SHOP CHIEFS	30	60
TOTAL	207	70

3 depicts the number of respondents in each grade. As expected, the majority of enlisted people responding to the survey held the grades of Master Sergeant to Chief Master Sergeant and the majority of the officers were in the ranks of Captain to Colonel. Figures 4, 5, 6 and 7 show the length of time the respondents have spent in the Air Force, in maintenance, in TAC, and in the current type of position. The percent of rated versus nonrated respondents is presented in Figure 8.

Internal Validity Results

The test for internal validity used a contingency table with the chi-squared statistic to determine if there was a

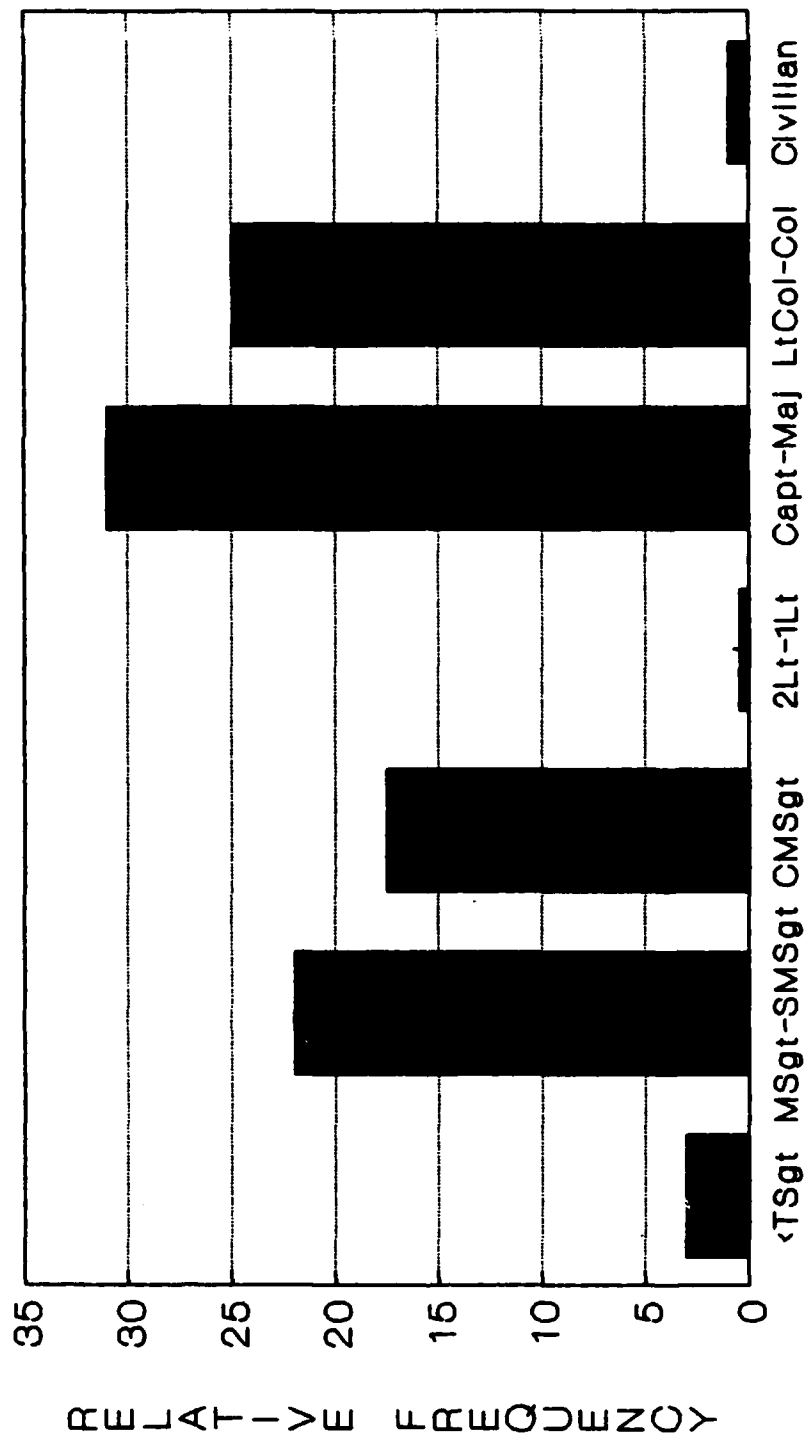


Figure 3. Current Rank of Respondents

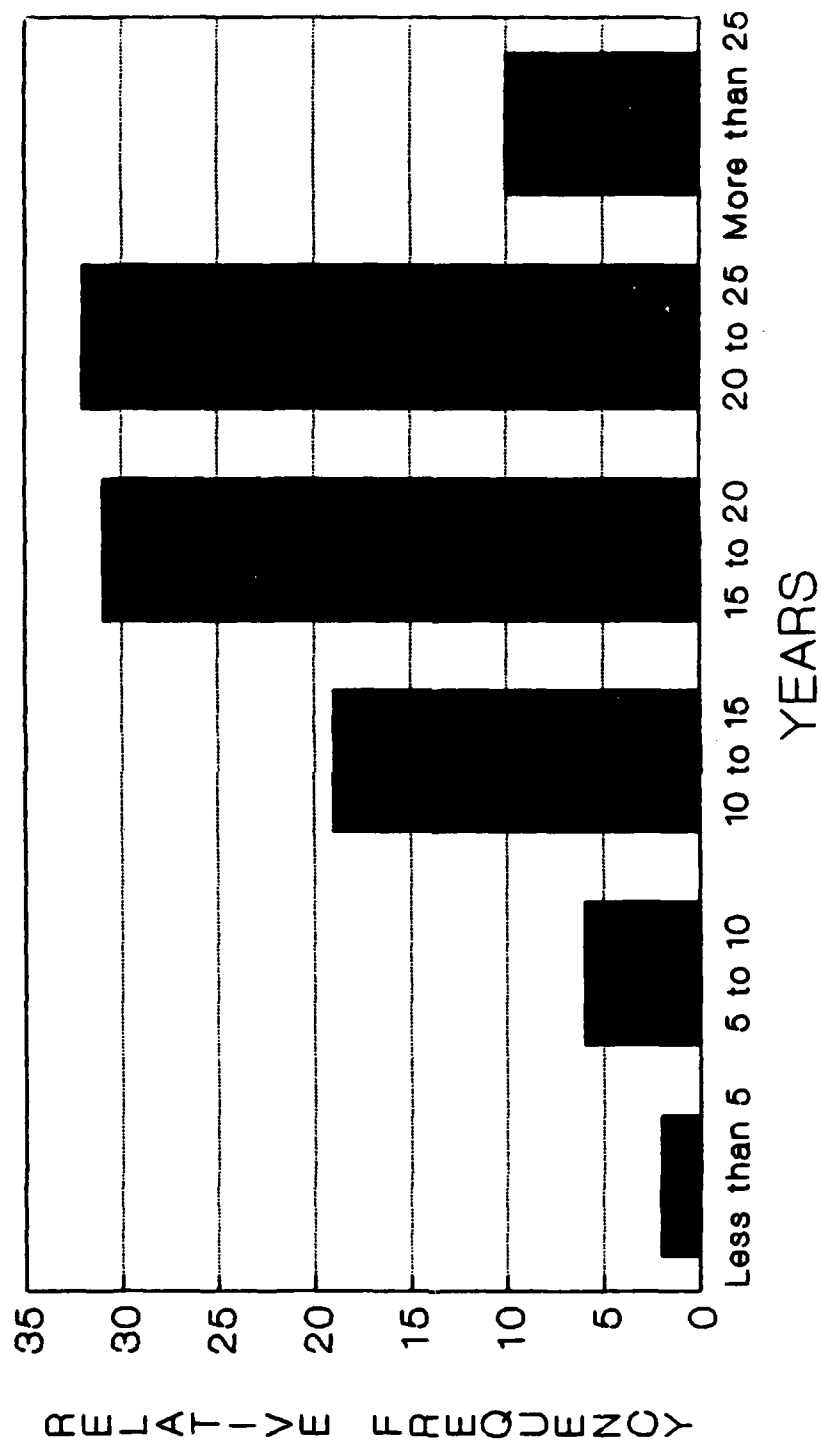


Figure 4. Years in the Air Force

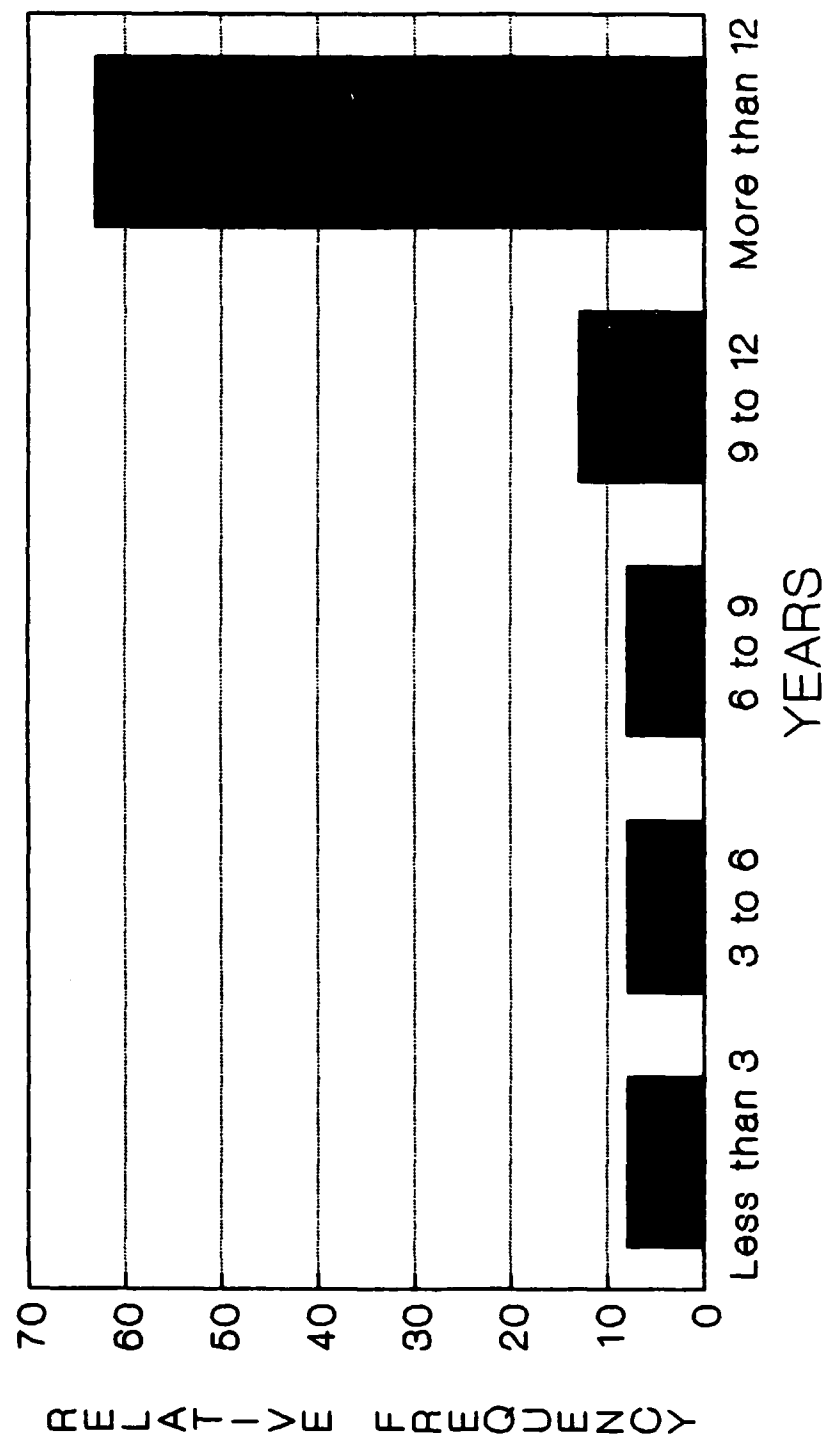


Figure 5. Years in Maintenance

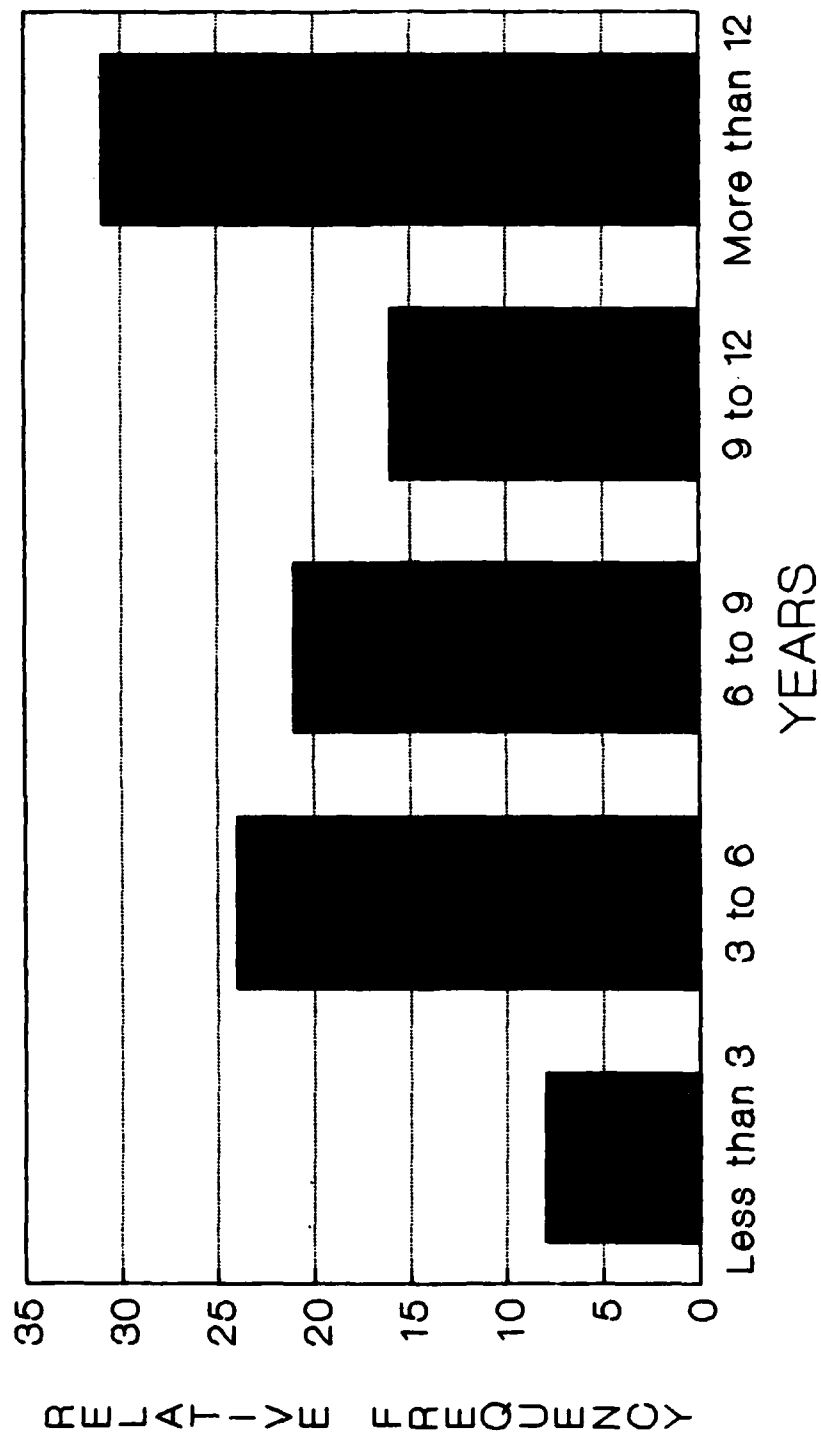


Figure 6. Years in TAC

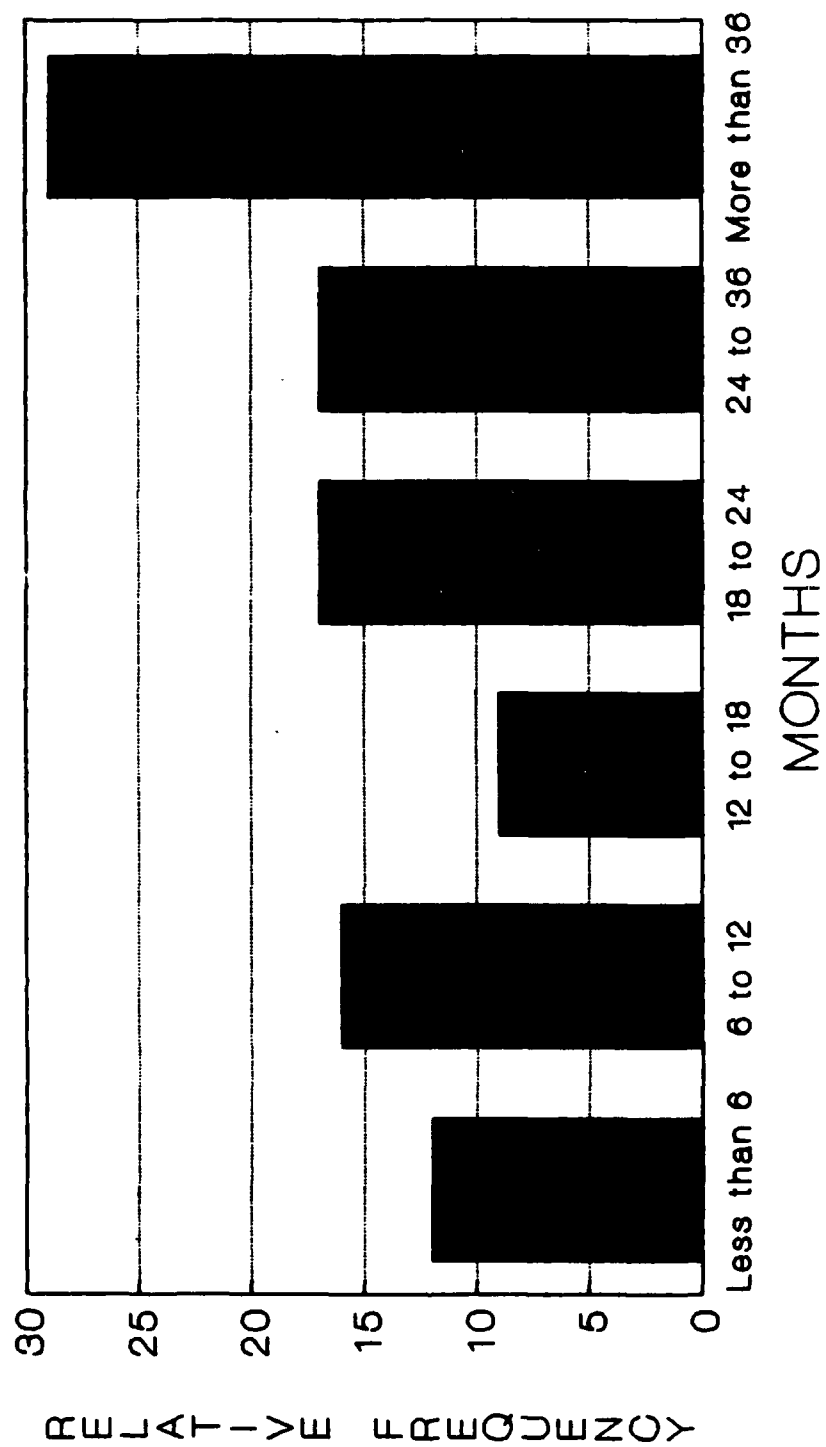


Figure 7. Months in Position

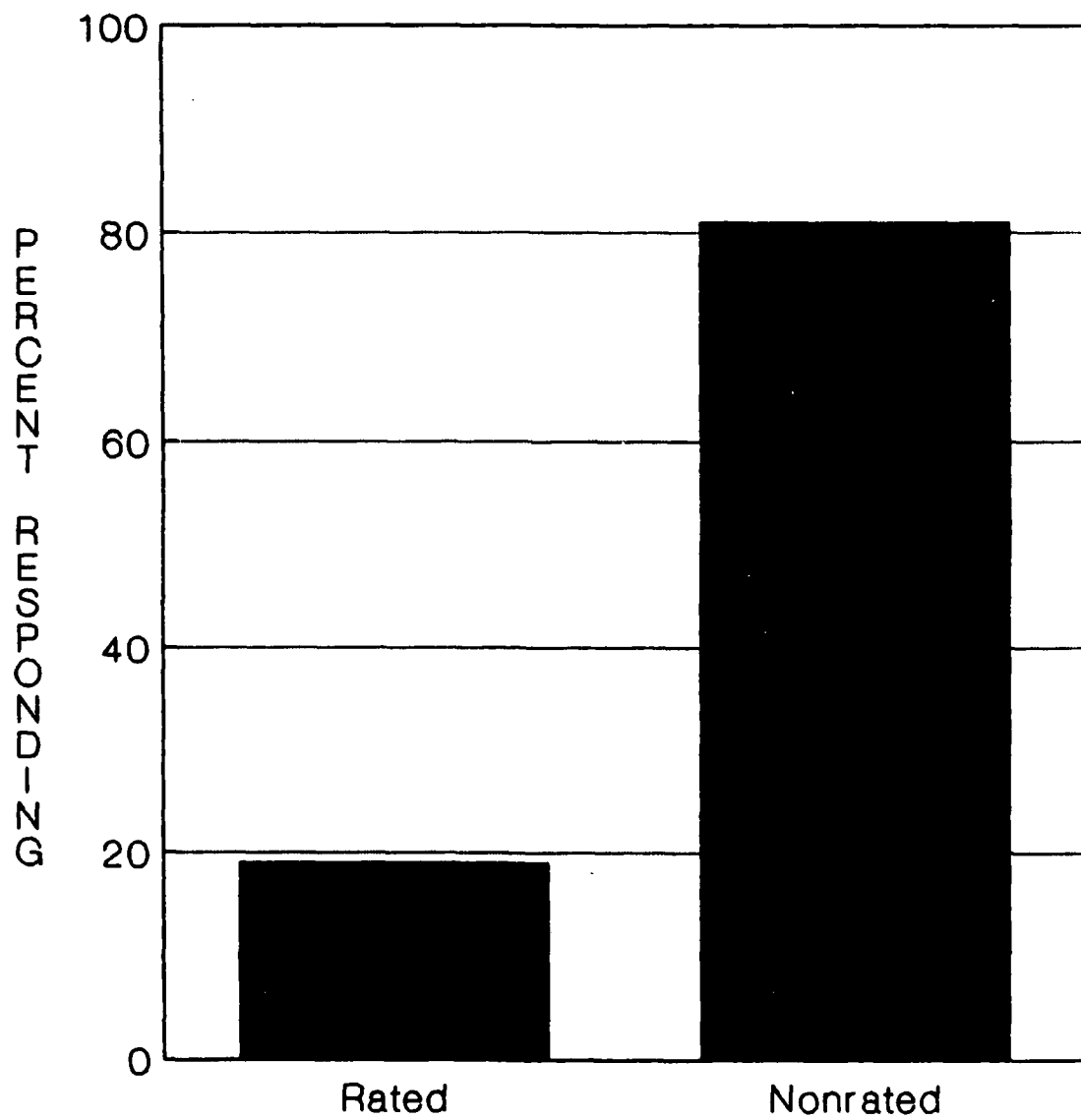


Figure 8. Percent Rated/Non-Rated in Sample

statistical difference in the responses between the different sections of the survey. Using the combined data from all respondents, the null hypothesis that there was no difference between sections of the survey was rejected at a 95% confidence level. Therefore, the choices selected throughout the survey do depend on the section examined. As a result, it was impossible to use parametric testing on sections four and five and consider the results to be representative of the entire survey.

The actual test was:

H_0 : There is no difference in the selection of technical and administrative skills between sections of the survey.

H_A : There is a difference in the selection of technical and administrative skills between sections of the survey.

Rejection Region (chi square value): 3.84146

Based on 1 degree of freedom

Test Statistic: 193.37

Similar tests were performed on each of the subgroups. In each case, the results were that the null hypothesis was rejected. Actual results are in Table 6.

Because sections four and five were not representative of the entire survey, all survey answers were analyzed using nonparametric testing. This testing consisted of using descriptive statistics and contingency tables using the

TABLE 6
RESULTS OF CHI-SQUARED TESTS FOR INTERNAL VALIDITY

SUBGROUP	TEST STATISTIC	RESULT
ALL RESPONDENTS	193.37	REJECT H_0
DCM	52.61	REJECT H_0
SQUADRON COMMANDER	69.53	REJECT H_0
MAINTENANCE SUPERVISOR	13.66	REJECT H_0
MAINTENANCE SUPERINTENDENT	42.36	REJECT H_0
BRANCH CHIEF	40.95	REJECT H_0
SHOP CHIEF	36.17	REJECT H_0
SUPERIOR GROUP	103.23	REJECT H_0
SUBORDINATE GROUP	111.43	REJECT H_0

chi-squared statistic to determine if there were preferences for administrative or technical skills and what those preferences were within and between groups.

Survey Problems

There were three main problems identified with the survey. These problems were identified when the data from the returned surveys was analyzed. The first problem was the lack of internal validity between sections of the survey. The second major problem was encountered in Section Two of the survey. The responses in Section Two were very different from the rest of the survey. These differences

did not account entirely for the lack of internal validity but were large enough to point out a significant problem with the survey design. The last problem was a number of officers responded to the surveys sent to Branch Chiefs.

The first problem, the lack of internal validity between sections of the survey was seen in each group and subgroup analyzed. This did not result from only one particular section of the survey being non-representative. Several of the individual section results varied enough from each other to cause the lack of internal validity. There are two possible explanations for this. The first explanation would be that the respondents were not consistent in their choices throughout the survey. However, this does not appear to be the problem. Since each group studied showed a lack of consistency, it is logical to assume the fault lies with the one common element, which is the survey instrument. A better explanation is that the questions were not as consistent as planned. While the sections of the survey all address whether a maintenance officer should possess technical or administrative skills, the individual choices themselves appear to be more divergent. There are levels of technical and administrative skills presented in the different questions. Therefore, a respondent may have a preference for a maintenance officer to possess technical skills over administrative skills, but at the same time does not want the maintenance officer to be

performing technical tasks. As a results, the respondent may choose an administrative response over a technical task based on the level of skill demanded in the choices. Therefore, because the level of technical and administrative skills were different in the various sections of the survey, the responses were not consistent.

This lack of consistency is extremely evident in Section Two of the survey. The results here were very different from the rest of the survey. All groups indicated a strong preference for administrative skills in this section in contrast to the mostly technical preference shown in the other sections of the survey. However, when the questions in this section were examined closer, it was seen the technical choices were mostly at the level of performing maintenance. The only question with a technical choice of understanding the technical aspects of the job was Question 12. This is the only question that had a high selection rate for the technical choice. Figure 9 presents the selection rates for the questions in Section Two for all respondents. This pattern was repeated in all groups and subgroups.

This pattern of not selecting technical choices at a 'perform' level is also seen in the responses to several other questions. Table 7 summarizes some of these questions.

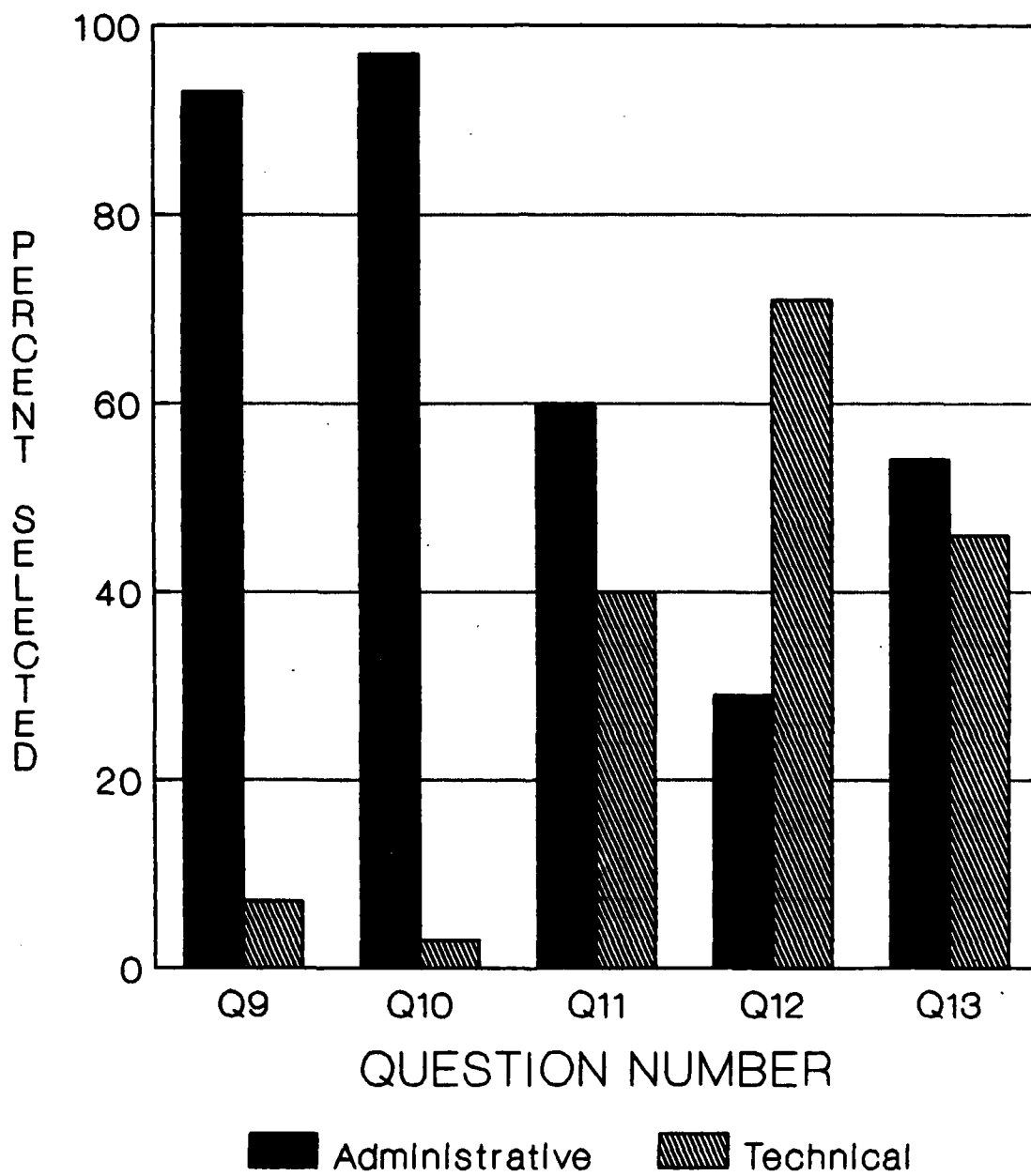


Figure 9. Selection Rates for Section 2 by All Respondents

TABLE 7
SELECTION RATE FOR 'PERFORM' LEVEL TECHNICAL QUESTIONS

QUESTION	TASK	SELECTION RATE
14-1	Troubleshoot major aircraft malfunctions	0%
14-4	Perform maintenance tasks	1%
15-5	Launching aircraft	1%
17	Troubleshoot aircraft problems	5%
21	Perform Quality inspections	3%
28	Perform simple maintenance tasks	4%

Therefore, the survey construction itself led to the answers in Section Two being different from the rest of the survey. Had there been less technical choices at the 'perform' level, then it is likely the results from this section would have more closely resembled those from the rest of the survey. However, this section was included in the analysis of the responses because these questions were considered valid when examined in the context of the entire survey.

The last problem was the discovery that 14 officers responded to surveys sent out to Branch Chiefs. Of these responses, 13 held the rank of Lieutenant to Major. It is assumed these individuals were currently in a branch level maintenance officer job. The title of Branch Chief is correctly applied to the NCOIC of the branch. However, this

appeared to cause confusion and several branch officers replied. These responses were removed from the sample data for all analyses as this group was not part of the population being studied.

Investigative Questions

Investigative Question 1. This question looked at each of the six subgroups individually to determine whether there was a preference for maintenance officers to possess technical or administrative skills and to see if there were any differences between groups. The hypothesis was that each of the superior subgroups would prefer a more administratively oriented maintenance officer. The Maintenance Superintendent subgroup was hypothesized to also prefer an administratively oriented maintenance officer. On the other hand, the Branch and Shop Chiefs would prefer a more technical maintenance officer.

A six-sample contingency table test was performed comparing the six subgroups to each other. The test statistic was calculated to be 47.8. Since the chi-squared value was 11.07, the null hypothesis that there was no difference in the responses of the six different groups was rejected. Therefore, analyses comparing each group to the others were performed. Those results follow.

DCM Subgroup. This group was comprised of 36 respondents serving in the positions of Deputy Commander for Maintenance or Assistant Deputy Commander for Maintenance.

Most respondents held the rank of Lieutenant Colonel or Colonel. The average answer to the length of time spent in the maintenance career field and in TAC was 9 to 12 years. The length of time spent in the position was almost uniformly distributed from 6 to 36 months. However, slightly more respondents had been in the position for greater than 18 months leading to the average length of time in the position being 18 to 24 months. Interestingly, 42 percent of the DCMs responding had a rated background.

Looking first at the relative frequency histogram of technical versus administrative choices shown in Figure 10, it can be seen that the DCM subgroup strongly preferred maintenance officers to possess technical skills. Of all the subgroups analyzed, the DCM group showed the strongest preference. The results of the one-sample contingency table test on the data also indicated there was a definite preference for technical abilities. Additionally, the strength of their preference was distinct enough that the DCM subgroup results were statistically significantly different from all other subgroups but the Squadron Commanders. This was determined using a two-sample contingency table test. The chi-squared statistic or rejection region was 3.84 at a 95 percent confidence level with 1 degree of freedom. The results are presented in Table 8.

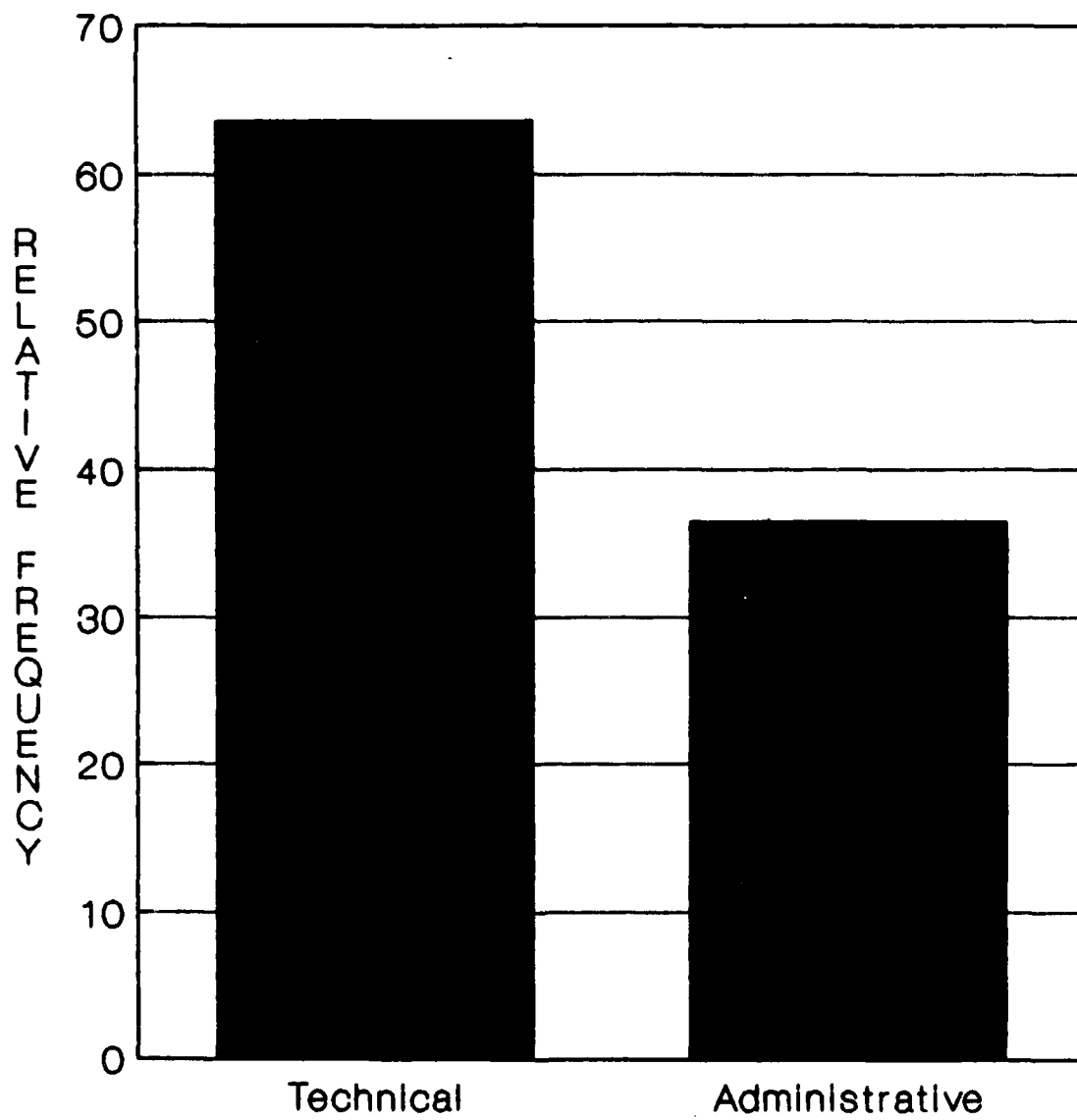


Figure 10. DCM Subgroup Selection Rates

TABLE 8
DCM SUBGROUP COMPARISONS

SUBGROUP	TEST STATISTIC	SIGNIFICANT DIFFERENCE
SQUADRON COMMANDERS	3.14	NO
MAINTENANCE SUPERVISORS	4.82	YES
MAINTENANCE SUPERINTENDENTS	30.19	YES
BRANCH CHIEFS	20.76	YES
SHOP CHIEFS	24.59	YES

These results tend to support the research showing different constituencies in the work force do have different expectations of effective behavior or performance.

Additionally, the three subgroups furthest from the DCM group in the chain of command indicate a substantially greater difference in expectations than those subgroups closer to the DCMs. Again this supports previous research.

However, the preferences expressed are vastly different from the hypothesized results. It was hypothesized the DCM subgroup would prefer a slightly administratively oriented maintenance officer. This research has shown this to be untrue. In fact, the DCM group strongly preferred maintenance officers to be technically oriented. Though unexpected, a possible reason for this preference is the fact the main responsibility of the DCM is to provide safe

and reliable aircraft. This is done through attention to technical details. Attention to administrative duties results in an efficient organization, but the primary job of maintenance is to be effective. Being effective results from technical competence. The DCMs want maintenance officers to put more emphasis on effective operations and therefore prefer technical skills.

While the technical preference was not anticipated, it is not unexpected that the DCM group would have a strong and definite opinion. This group is at the top of the hierarchy in maintenance and routinely makes decisions regarding the maintenance organization. While the DCM must perform his job to the satisfaction of the Wing Commander, most DCMs have complete authority over the maintenance organization. Therefore, this group would be more likely to answer the survey based on their feelings rather than basing their responses partially on the perceived desires of someone of higher authority. This would result in the more unequivocal response seen.

Squadron Commander Subgroup. Thirty-eight people responded in this subgroup. There were equal numbers of Captains and Majors as Lieutenant Colonels and Colonels responding. The average length of time in the maintenance career field was 9 to 12 years, while the average length of time in TAC was 6 to 9 years. The respondents had been in this type of position for an average of 12 to 18 months.

Less than 19 percent had been in the position for greater than 2 years. This group had the largest number of people who held an aeronautical rating with 45 percent of the respondents saying they were rated.

Figure 11 presents a histogram depicting the selection rate of technical and administrative responses. The Squadron Commanders appear to prefer maintenance officers to be more technically than administratively oriented. This was confirmed by nonparametric testing. A one-sample contingency table showed that there was a statistically significant difference in the selection rate between administrative and technical skills. Coupled with the histogram, this indicated the Squadron Commander subgroup preferred maintenance officers to be more technically oriented.

The preference expressed by the Squadron Commanders was not statistically different from either the Maintenance Supervisors or the DCMs. However, there was a distinct difference between them and each of the subordinate groups. Table 9 summarizes the results of the various contingency table tests. These results were expected. The Squadron Commander subgroup was predicted to agree closely with both the DCM and Maintenance Supervisors. The comparison of the Squadron Commanders with the Maintenance Supervisors shows a strong similarity between the choices of these two groups. These two subgroups work closely together in the day to day

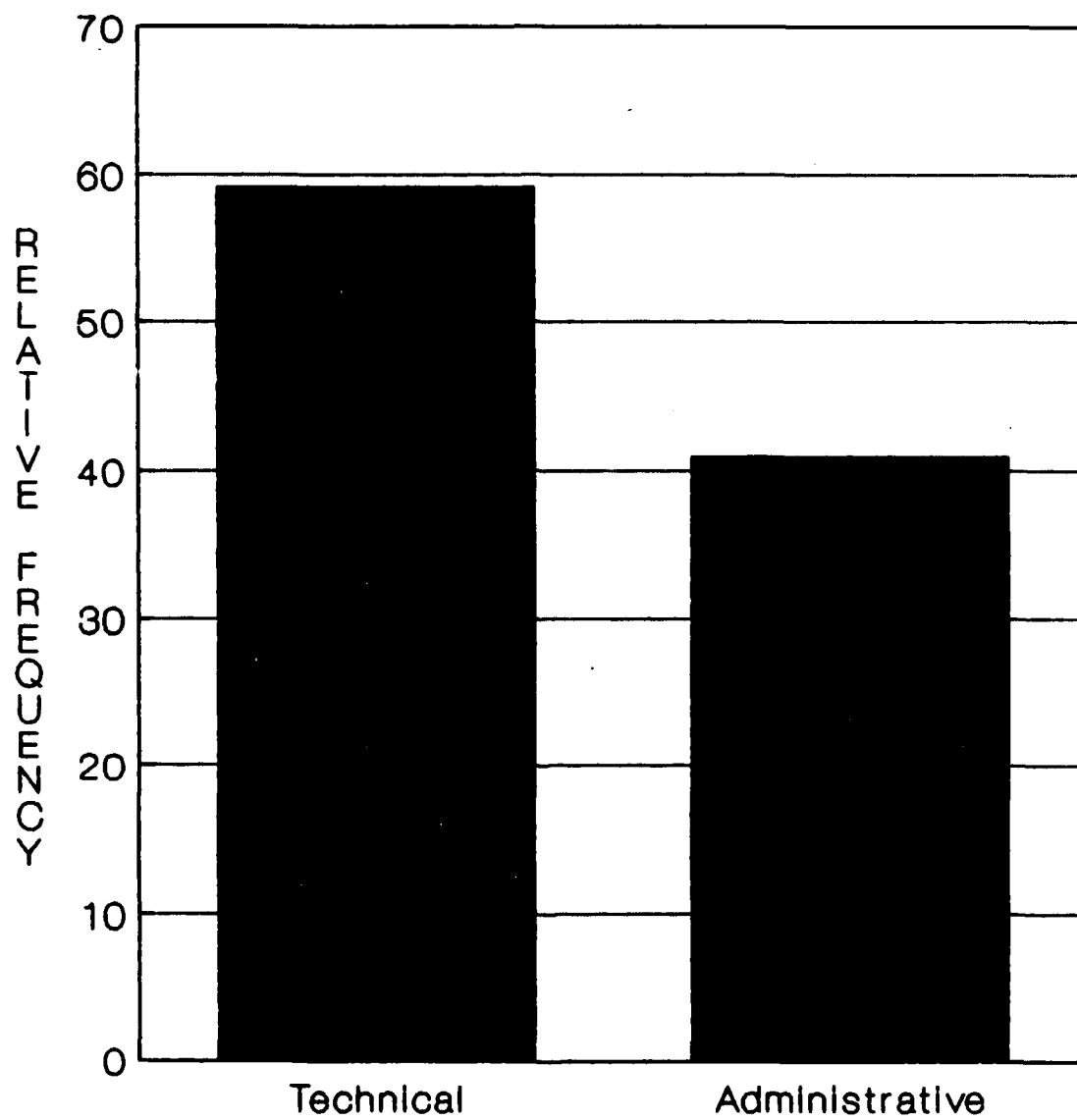


Figure 11. Squadron Commander Subgroup Selection Rates

TABLE 9
SQUADRON COMMANDER SUBGROUP COMPARISONS

SUBGROUP	TEST STATISTIC	SIGNIFICANT DIFFERENCE
DCMs	3.14	NO
MAINTENANCE SUPERVISORS	0.18	NO
MAINTENANCE SUPERINTENDENTS	14.58	YES
BRANCH CHIEFS	8.61	YES
SHOP CHIEFS	10.91	YES

operations of the maintenance organization and would be expected to have similar opinions. The Squadron Commanders also agreed with their immediate superiors, the DCMs, as predicted.

As with the DCM subgroup, the preference for technical abilities expressed by the Squadron Commanders was contrary to the hypothesis they would prefer administrative skills. It appears they agree with the DCMs that maintenance officers should be more technically oriented. This may also result from almost half of the respondents having a rated background. These officers would themselves be more familiar and comfortable with the technical aspects of the aircraft while at the same time be more unfamiliar with the administrative end of running a maintenance unit. Based on their background, they feel the technical aspects can make

or break a career. Therefore, they would consider the technical skills to be more valuable.

Maintenance Supervisor Subgroup. This subgroup was the largest with 44 people responding to the survey. Of those responding, 98 percent held the rank of Captain to Major. The average length of time spent in maintenance was between 6 and 12 years. The number of years spent in TAC averaged between six and nine years. The respondents had been in the present type of position for an average of 12 to 18 months. In contrast to the Squadron Commanders and DCMs, only five percent of the Maintenance Supervisors held an aeronautical rating.

Maintenance Supervisors prefer technical skills over administrative skills. Figure 12 depicts a histogram of the relative frequencies of the number of technical and administrative responses from this group. The preference for technical abilities was confirmed statistically through the use of a one-sample contingency table test. The chi-squared statistic was 3.84 at a 95 percent confidence level. The test statistic was calculated to be 19.58 and therefore the null hypothesis that the selection rate was the same between technical and administrative responses was rejected.

Statistical testing showed the Maintenance Supervisors only agreed with the Squadron Commanders. It was expected these two groups would hold similar opinions. However, it was also expected that the Maintenance Superintendents and

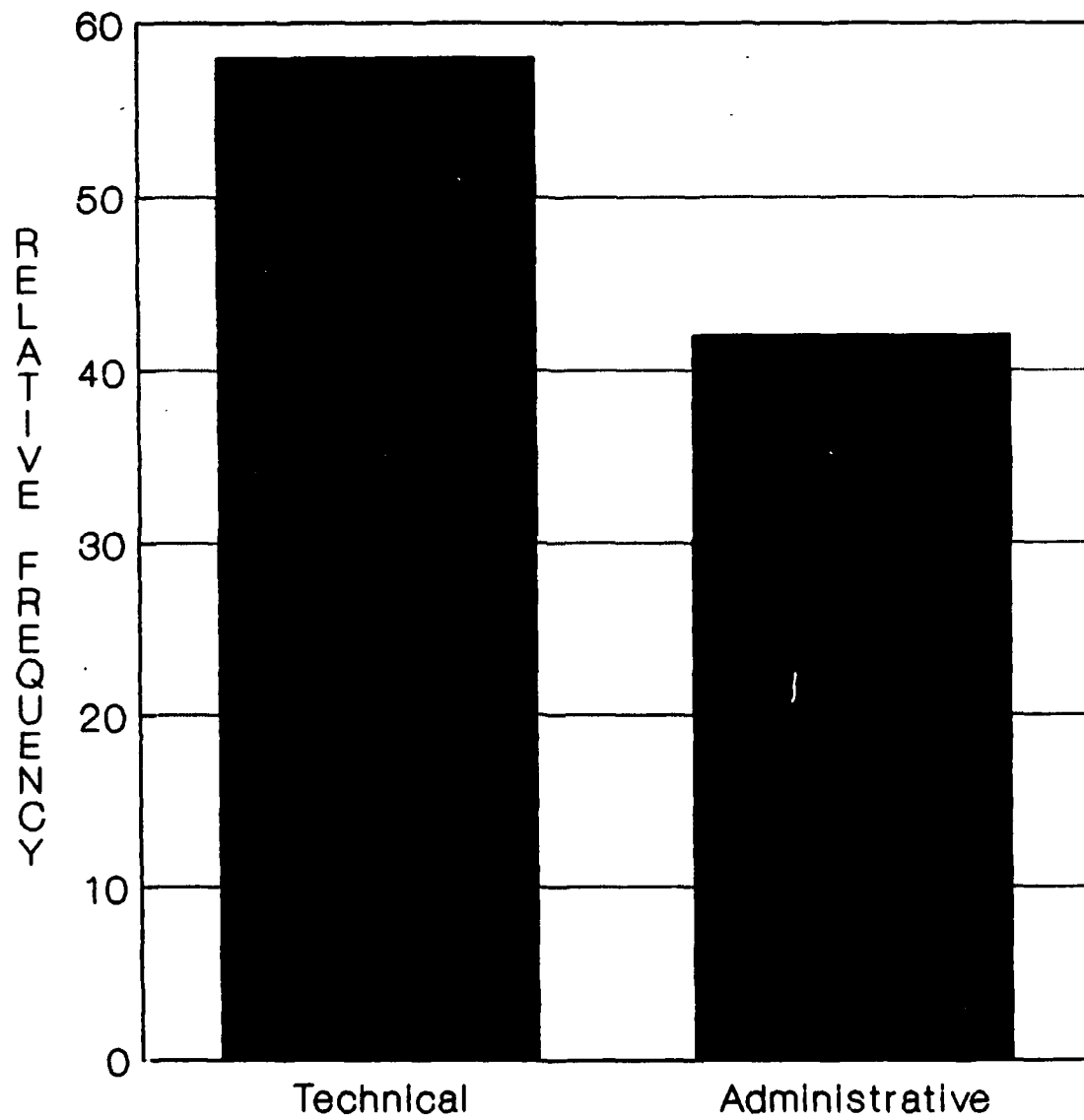


Figure 12. Maintenance Supervisor Subgroup Selection Rates

Maintenance Supervisors would have results that closely resembled each other. Not only are the two subgroups close to each other in the hierarchy, they work side by side on a daily basis. The two subgroups are almost co-equal in their control of the maintenance officer. Therefore, it was expected they would share similar opinions on what makes an ideal maintenance manager. However, the results indicate there is a significant difference of opinions between the two groups. The results of all the statistical tests are summarized in Table 10.

TABLE 10
MAINTENANCE SUPERVISOR SUBGROUP COMPARISONS

SUBGROUP	TEST STATISTIC	SIGNIFICANT DIFFERENCE
DCMs	4.82	YES
SQUADRON COMMANDERS	0.18	NO
MAINTENANCE SUPERINTENDENTS	11.70	YES
BRANCH CHIEFS	6.49	YES
SHOP CHIEFS	8.47	YES

As with all of the superior subgroups, the Maintenance Supervisors indicated they preferred a more technically oriented maintenance officer. This was contrary to the hypothesis which stated this group would prefer a slightly more administratively oriented maintenance manager. This

could result from influence from both the Squadron Commander and DCM subgroups. Both of these groups are higher in the chain of command for the Maintenance Supervisor. At the same time, the Maintenance Superintendent subgroup would have less impact on the opinions of the Maintenance Supervisor as they are subordinate to them. Additionally, the Maintenance Supervisor is just one level above the maintenance officer in the organizational hierarchy. Therefore, their opinions may be a result of what they felt were more useful skills to possess. This group is selected from the ranks of the maintenance officer and if they felt they were successful based on technical expertise, these would be the skills they would prefer.

Maintenance Superintendent Subgroup. There were 32 respondents in this group. Of this number, 84 percent held the rank of Chief Master Sergeant while the remainder were in the ranks of Master Sergeant and Senior Master Sergeant. On the average, the respondents had spent more than 12 years in the maintenance career field and had 6 to 9 years experience in TAC. Most of the respondents had extensive experience in their present type of position with the average length of time in the position being between two and three years. Twelve percent of the respondents reported holding an aeronautical rating.

The histogram showing the relative frequencies of technical and administrative choices made by the Maintenance

Superintendents is shown in Figure 13. It indicates a slight numerical preference for administrative talents. This group was the only one to show such a preference. However, testing showed there was not a statistically significant difference in the selection rates. Instead, this group actually favored neither technical nor administrative abilities. With a chi-squared value of 3.84 at a 95 percent confidence level, the null hypothesis (there was no difference between the selection rate for technical and administrative skills) was not rejected. The test statistic was calculated to be 0.30 which was well below the rejection region.

The Maintenance Superintendent subgroup was compared to each of the other subgroups. It was seen the preference of the two other subordinate groups, the Branch and Shop Chiefs, showed no significant difference from this group. Each of the superior groups did however express a difference from the Maintenance Superintendents. Table 11 lists the results of the nonparametric testing. The test statistic was again 3.84 at a 95 percent confidence level.

As expected, the Maintenance Superintendent subgroup showed agreement with both the two other groups comprising the subordinates. These three groups would likely hold many of the same opinions as each group steps up in the career progression of the enlisted manager. It appears there was little difference in their opinions. However, it was also

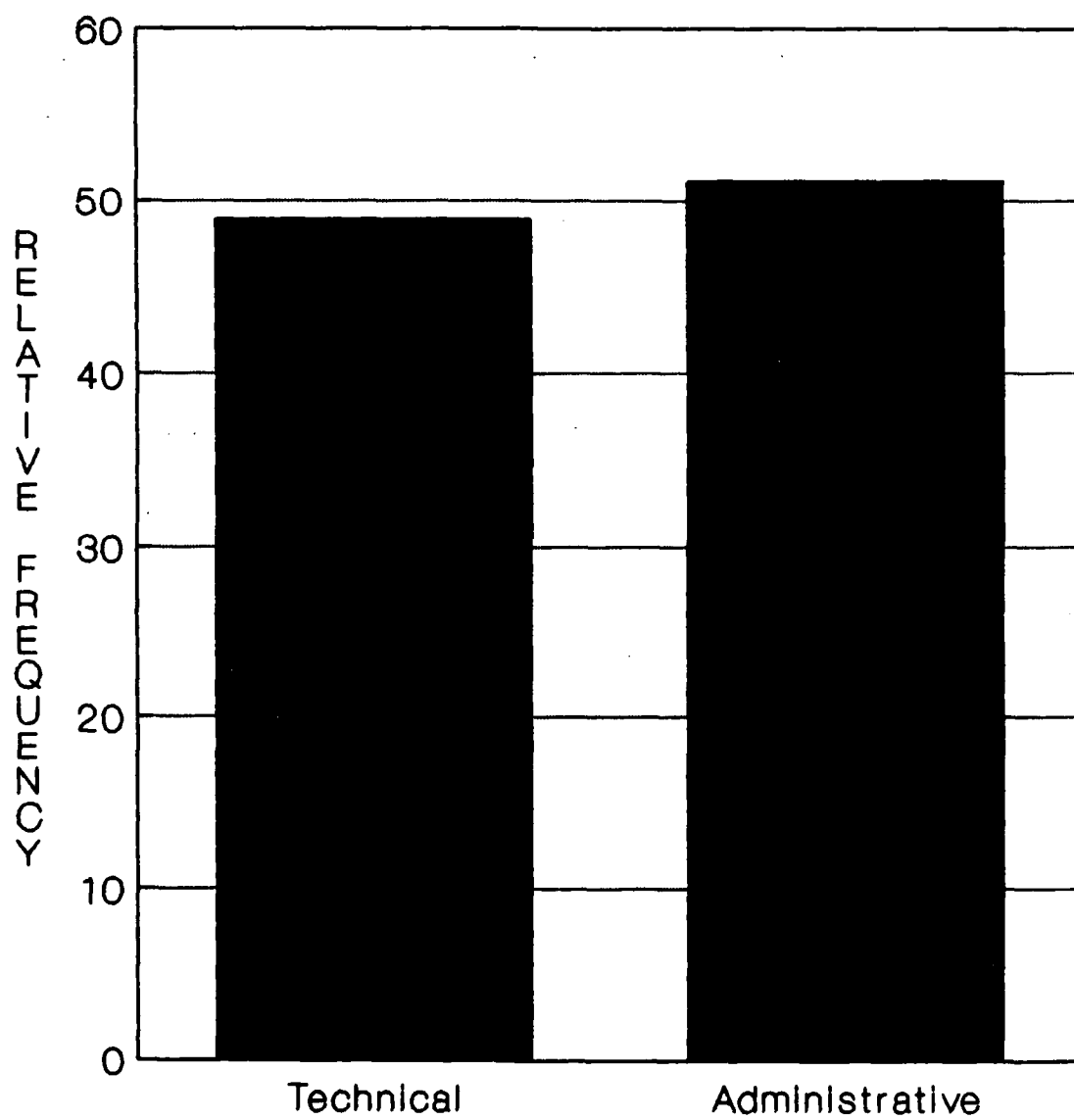


Figure 13. Maintenance Superintendent Subgroup Selection Rates

TABLE 11
MAINTENANCE SUPERINTENDENT SUBGROUP COMPARISONS

SUBGROUP	TEST STATISTIC	SIGNIFICANT DIFFERENCE
DCMs	30.19	YES
SQUADRON COMMANDERS	14.58	YES
MAINTENANCE SUPERVISORS	11.70	YES
BRANCH CHIEFS	0.51	NO
SHOP CHIEFS	0.19	NO

expected the Maintenance Superintendents would hold similar opinions to the Maintenance Supervisors, but this was not supported by the study. As discussed earlier, both groups work closely together in the maintenance organization. It appears the opinions of the Maintenance Superintendents are more closely aligned to the other enlisted managers than to the Maintenance Supervisors.

One unique thing about this group is that it is not actually in the chain of command for the branch level maintenance officer. The Maintenance Superintendent does not work for the maintenance officer but is at a level of management one step higher. However, the maintenance officer does not officially work for the Maintenance Superintendent either. For this reason, the Maintenance Superintendent is removed from the direct chain of command for the branch maintenance officer.

Even though the subgroup did not have a significant preference for either technical or administrative skills, it did show a slight numerical preference for administrative talents. One possible explanation for this would be that the Maintenance Superintendents have been in the maintenance career field for many years and consider themselves to be the technical experts. Since they can handle the technical aspects, they would prefer the maintenance officer to be slightly more administratively oriented and able to handle the "paperwork" aspects of the job instead. However, since they showed no significant preference for either skill, it could also be assumed they would like a maintenance officer to ideally be able to handle both administrative and technical skills with equal competence. The hypothesis that this group would prefer a slightly more administrative maintenance officer was disproved.

Branch Chief Subgroup. Twenty-seven people responded in this category making it the smallest subgroup. Of the respondents, two-thirds held the ranks of Master Sergeant to Senior Master Sergeant and the remaining third were Chief Master Sergeants. All but two of the people responding had been in the aircraft maintenance career field for over 12 years and the average length of time spent in TAC was 12 years or more. This group also averaged having been in this type of position for two to three years.

The relative frequency histogram depicted in Figure 14 indicates the Branch Chief subgroup showed almost no preference for either technical or administrative skills. Technical responses were selected 50.9 percent of the time and administrative choices were made 49.1 percent of the time. This lack of preference was confirmed with statistical testing using a one-sample contingency table. The test statistic was calculated to be 0.21 which led to the conclusion there was no significant difference in the rate of selection of technical or administrative answers.

When compared to the other subgroups, the Branch Chiefs showed no statistical difference from the groups directly above and below them in the chain of command. However, there was a difference in the preference of the Branch Chiefs and each of the superior subgroups. The specifics of the tests are included in Table 12. The rejection value of chi-squared was 3.84 at a 95 percent confidence level.

These findings support previous research showing that groups close together in the organization tend to want managers to possess similar talents to be effective. This group agreed with those groups closest to it in the organizational hierarchy. Along with the Maintenance Superintendents and Shop Chiefs, they felt that neither of the two skills were more important than the other. Instead, they felt the maintenance officer should be equally skilled in administrative and technical abilities. They also did

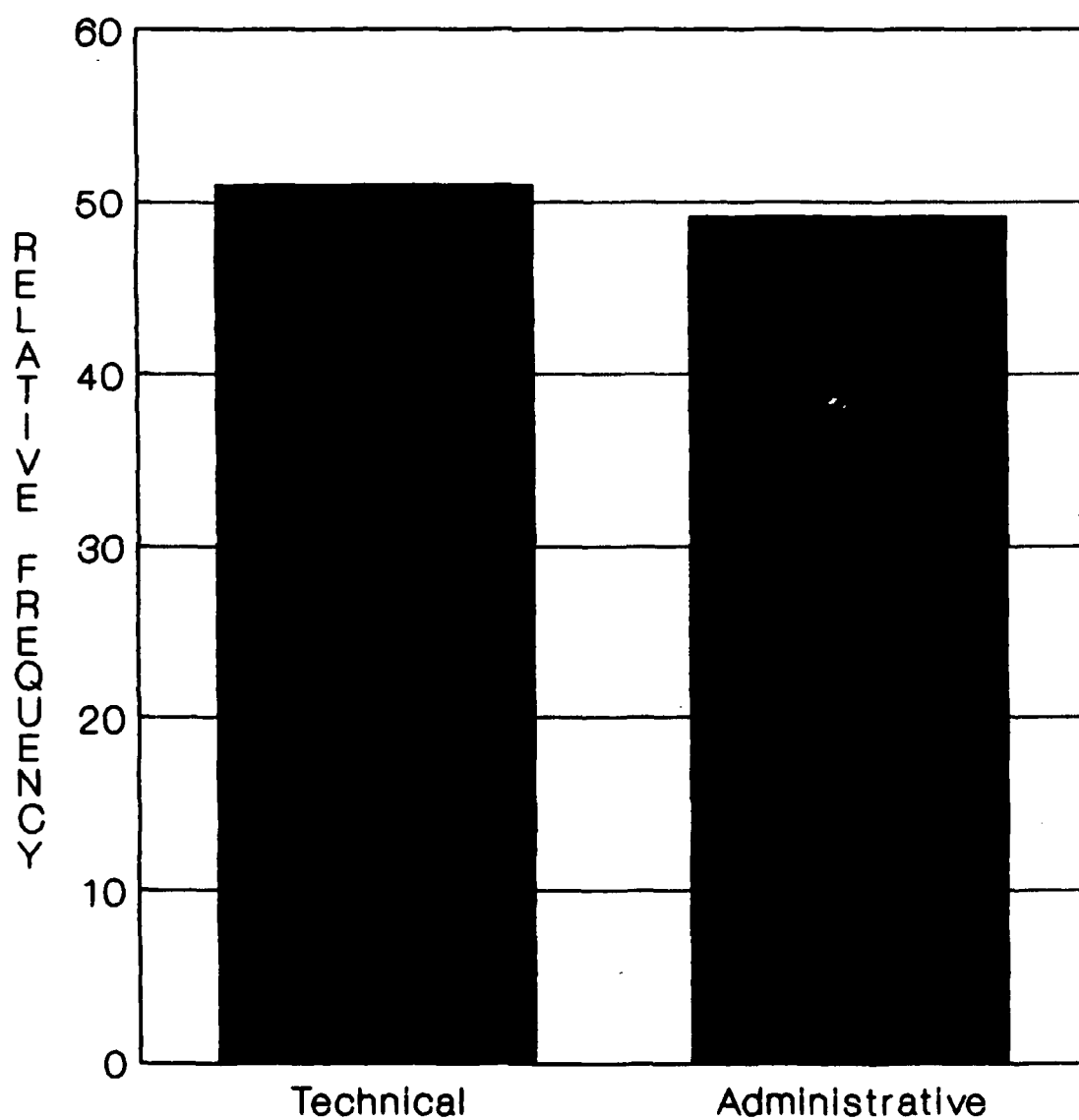


Figure 14. Branch Chief Subgroup Selection Rates

TABLE 12
BRANCH CHIEF SUBGROUP COMPARISONS

SUBGROUP	TEST STATISTIC	SIGNIFICANT DIFFERENCE
DCMs	20.76	YES
SQUADRON COMMANDERS	8.61	YES
MAINTENANCE SUPERVISORS	6.49	YES
MAINTENANCE SUPERINTENDENTS	0.51	NO
SHOP CHIEFS	0.08	NO

agree with the groups further away from them in the organization. The superior groups all expressed a desire for the maintenance officer to possess technical skills to varying degrees while the Branch Chiefs had no preference.

The Branch Chief group also holds one distinction that the other groups do not. This group most closely works with the branch level maintenance officer. In fact, both the Branch Chief and the maintenance officer should be working in concert daily. It is their joint responsibility to successfully manage the branch. Therefore, this group has one of the better perspectives of what makes a maintenance officer successful. From the responses received, it would appear they feel a maintenance officer should be able to effectively handle both the administrative and technical aspects of the aircraft maintenance job. This is in

contrast to the hypothesis that this group would prefer a more technically oriented maintenance officer.

Shop Chief Subgroup. This group had 30 respondents. Of this group, 73 percent were in the ranks of Master Sergeant to Senior Master Sergeant, 23 percent held the rank of Airman to Technical Sergeant, and 4 percent were civilians. The group averaged over 12 years in the aircraft maintenance career field and slightly less time in TAC at 9 to 12 years. The average length of time spent in a shop chief position averaged between 24 to 36 months. The demographics of this group very closely resembled that of the Branch Chief subgroup.

As with the Branch Chiefs, the Shop Chiefs showed very little preference for either technical or administrative skills. Figure 15 depicts the relative frequency histogram showing the percentages of administrative and technical answers selected. This group was the closest to choosing the two different skills equally. Nonparametric testing confirmed there was no significant difference in the selection rates of administrative and technical responses. The rejection region was found to have a chi-squared value greater than 3.84. The test statistic for this test was calculated to be 0.007. Therefore, there was no difference in the selection rates.

When comparing the Shop Chiefs to each of the other subgroups, their opinions were not significantly different

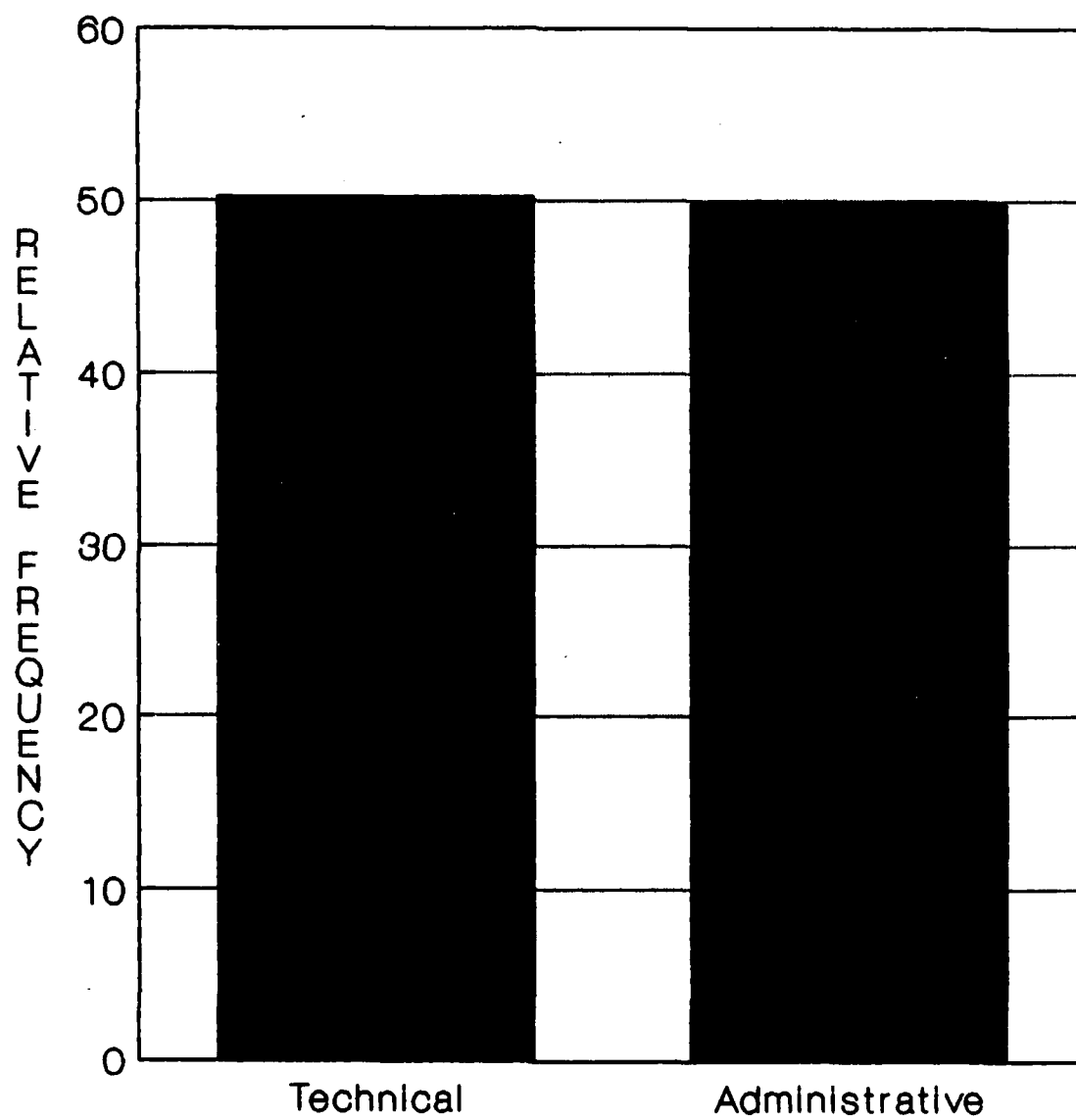


Figure 15. Shop Chief Subgroup Selection Rates

from the Branch Chiefs and Maintenance Superintendents. This is again consistent with research stating that groups close together in the organizational hierarchy tend to judge the effectiveness of a manager based on similar preferences. This group also did not agree with the superior groups as expected. The superior groups are further away from the Shop Chiefs in the organization. In fact, it would be unlikely for the Shop Chiefs to have many direct dealings with any of the superior groups. The only officer the shop chief would have regular contact with would be the branch level maintenance officer. A summary of the statistical testing is included in Table 13. The chi-squared value for rejection was 3.84.

TABLE 13
SHOP CHIEF SUBGROUP COMPARISONS

SUBGROUP	TEST STATISTIC	SIGNIFICANT DIFFERENCE
DCMs	24.59	YES
SQUADRON COMMANDERS	10.91	YES
MAINTENANCE SUPERVISORS	8.47	YES
MAINTENANCE SUPERINTENDENTS	0.19	NO
BRANCH CHIEFS	0.08	NO

The results of the Shop Chief subgroup closely match those of the Branch Chief level. In addition to their close proximity in the chain of command, another explanation for the similarity of answers is the close resemblance of the two groups in the demographics of the respondents. Both groups were quite similar to each other. Therefore, many of the opinions expressed may be more dependent on other factors than on the particular job held. These factors could be time in the command, time in maintenance or even the fact that the enlisted managers tend to view things differently than the commissioned officers.

It had been hypothesized this group would prefer the maintenance officer to be slightly more technically oriented. The results of the survey were surprising as they showed the Shop Chiefs did not prefer administrative or technical skills. Instead, they want the maintenance officer to possess both skills equally. This group has a lot of direct dealings with the maintenance officer. The successful operations of each shop contribute to the overall success of the branch. The Shop Chiefs look to the maintenance officer for direct support and would therefore want both skills to be possessed equally.

Investigative Question 2. This question addressed whether the superiors (commissioned officers) and the subordinates (enlisted supervisors) of the branch level maintenance officer preferred technical or administrative

skills and whether they differed in their opinions. It was hypothesized the commissioned officers would prefer a more administratively oriented maintenance officer while the enlisted supervisors would prefer a more technically skilled maintenance officer.

The histogram in Figure 16 compares the selection frequency of both groups of technical and administrative skills for both groups. From a numerical standpoint, the hypothesis was disproved. The superior group had a strong preference for more technically oriented maintenance officers while the subordinate group showed a slight preference for administrative skills.

Nonparametric testing comparing the superior and subordinate group responses indicate there was a statistically significant difference between the two groups at a 95% confidence level. The chi-squared statistic was 3.84 and the test statistic was calculated as 42.6. Therefore, the null hypothesis that there was no difference between the two groups was rejected. These analyses indicated the superior and subordinate groups showed different preferences for administrative and technical skills.

The two groups were also examined individually. A one-sample chi-squared test was performed on each group to see if there was a statistically significant difference between the number of technical and administrative choices. In the

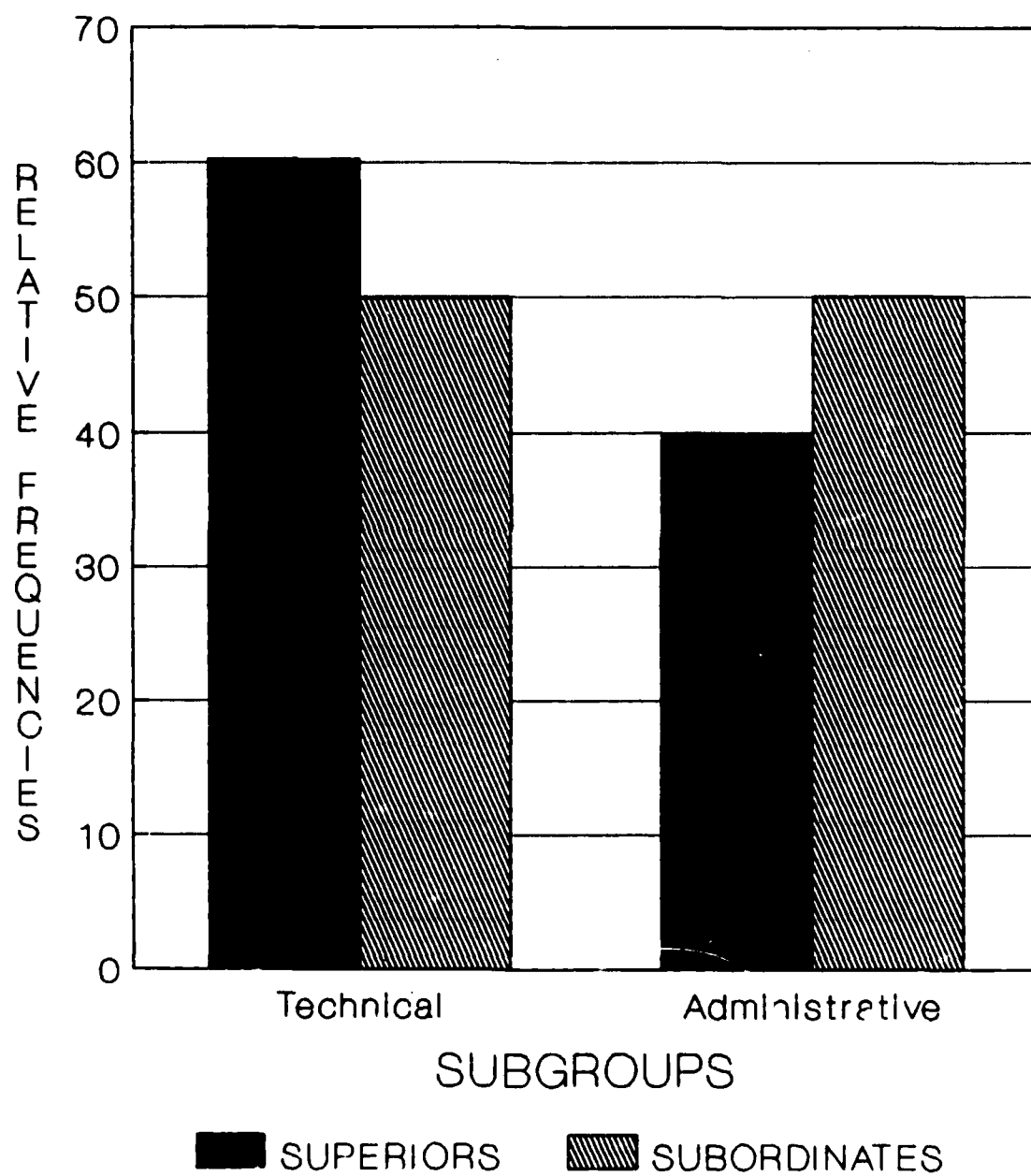


Figure 16. Superior and Subordinate Subgroup Selection Rates

case of the superior group, the results of the test indicate there was a significant difference. However, the results of the same test on the subordinate group showed there was no statistical difference between the number of administrative or technical answers selected. In other words, the subordinate subgroup did not have a specific preference for either technical or administrative skills while the superior group preferred technical skills over administrative.

Each of the groups were further investigated to identify the level of agreement or disagreement between the subgroups within it. Each subgroup was compared to the remainder of the group to identify any trends. Table 14 summarizes those findings.

TABLE 14
ANALYSIS OF SUPERIOR AND SUBORDINATE GROUPS

SUBGROUP	GROUP	TEST STATISTIC	SIGNIFICANT DIFFERENCE
SHOP	BRANCH/MX SPT	0.01	NO
BRANCH	SHOP/MX SPT	0.33	NO
MX SPT	SHOP/BRANCH	0.44	NO
MX SUP	SQCC/DCM	2.26	NO
SQCC	MX SUP/DCM	0.62	NO
DCM	MX SUP/DCM	5.18	YES

As can be seen from the table, only the DCMs had a significant difference in their responses in the superior group. The Maintenance Supervisors and Squadron Commanders showed no significant difference in their choices. Within the subordinate subgroup, none of the groups showed a significant difference from the others.

These results are interesting due to the fact that of the two groups, the superior group is more homogeneous when considering the chain of command for the branch level maintenance officer. Each of the three subgroups directly step up the chain of command. As a result, it was expected these three groups would hold similar opinions. On the other hand, in the subordinate group, the Maintenance Superintendent does not fall in the direct chain of command of the branch level maintenance officer. The officer neither works for nor has the maintenance superintendent working for them. Because this group is more heterogeneous it could be expected that the subgroups, particularly the Maintenance Superintendents, would have differing opinions.

Investigative Question 3. This question asked whether TAC wing level maintenance supervisors, both commissioned and noncommissioned officers, preferred branch level maintenance officers to be more technically or administratively oriented. Based on personal observations, it was hypothesized that a more technically oriented

maintenance officer would be preferred by the supervisors when considered as one group.

The relative frequency histogram shown in Figure 17 shows the frequency of administrative and technical responses for all respondents. A definite preference for technical skills over administrative skills is seen. Technical skills were preferred 55.6% of the time while administrative skills were selected 44.4% of the time.

To test whether this was a statistically significant difference, a contingency table using the chi-squared statistic was employed. The chi-squared one-sample test was used. The test was:

H₀: There is no difference in the number of technical and administrative responses.

H_A: There is a difference in the number of technical and administrative responses.

The expected frequencies were calculated to be 50 percent technical and 50 percent administrative. The actual numerical count for the expected frequencies was 2038.5. The test statistic was calculated to be 51.23. Since the chi-squared statistic was 3.84, the results of the test show there is a statistically significant difference in the preference of the maintenance supervisors. TAC maintenance supervisors prefer branch level maintenance officers to be more technically oriented than administratively oriented.

Over 69% of the respondents had been in TAC for 6 years or more. Since the majority of respondents had spent this

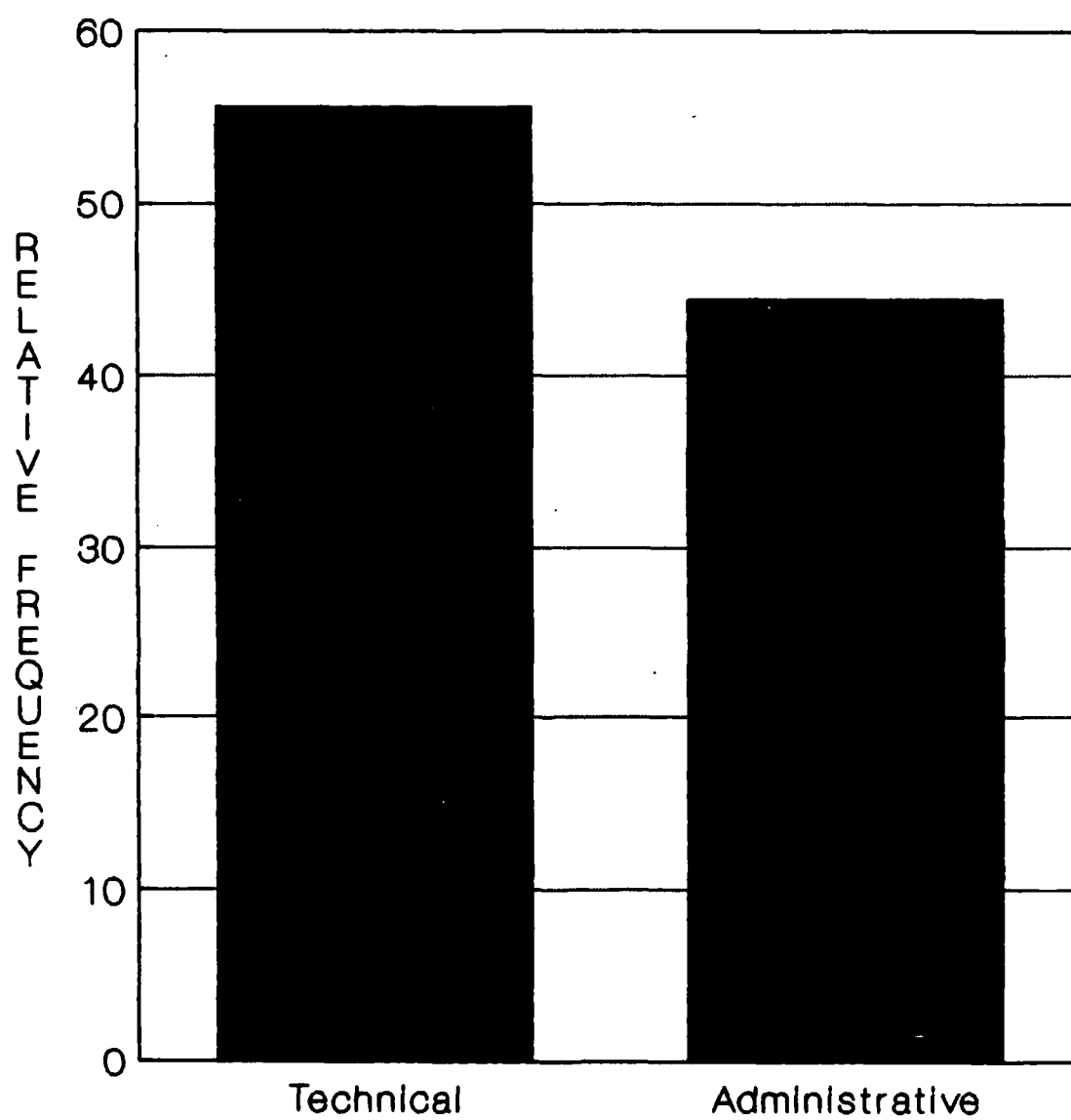


Figure 17. Overall Selection Rates

much time in the command, these results are assumed to reflect the opinions of TAC maintenance supervisory personnel. Additionally, over 84% of the people had spent at least 6 years in the maintenance career field. While the personnel had not necessarily had all their maintenance experience in TAC, these findings still reflect the opinions of people with substantial maintenance experience.

Investigative Question 4. This question addressed the length of time the respondent had spent in TAC, asking whether there was a difference between the responses of people with less than three years in the command and those people with more than three years in TAC. The hypothesis was there would be a difference between the responses of the two groups. Those respondents with less than three years in TAC would respond with no particular pattern while those with more time in TAC would respond as predicted by the first three hypotheses.

However, there were only 16 respondents who had less than 3 years in the command. This was less than eight percent of the returned surveys. Due to the limited number of respondents in this category, the question could not be analyzed with any true significance.

Additional Analyses. There were two additional planned analyses done. These were analyses of question number 16 and questions 62, 63, and 65. An unplanned analysis comparing the responses of the rated and non-rated officers

in the Squadron Commander and DCM subgroups was also done due to interesting information uncovered during the analysis of the investigative questions.

Question 16. This question was analyzed separately because the answers could not be broken down solely into administrative or technical choices. However, the information requested by the question was intriguing. The question stated:

It is most important for the maintenance officer to:

- 1) Perform aircraft maintenance work and understand administrative work
- 2) Perform aircraft maintenance work and perform administrative work
- 3) Perform administrative work and understand aircraft maintenance work
- 4) Understand administrative work and understand aircraft maintenance work

Figure 18 presents a relative frequency histogram of the responses from Question 16. The responses are from the entire group of respondents. Presented in Figure 19 is the same information for the superior and subordinate groups.

This data supports the earlier contention that while overall the supervisors want maintenance officer to possess more technical abilities, they do not want them to be performing maintenance. Overall, only 12 percent of the respondents chose a answer with the perform aircraft maintenance choice involved. Superiors chose these answers the most at 14 percent, while the subordinate group selected

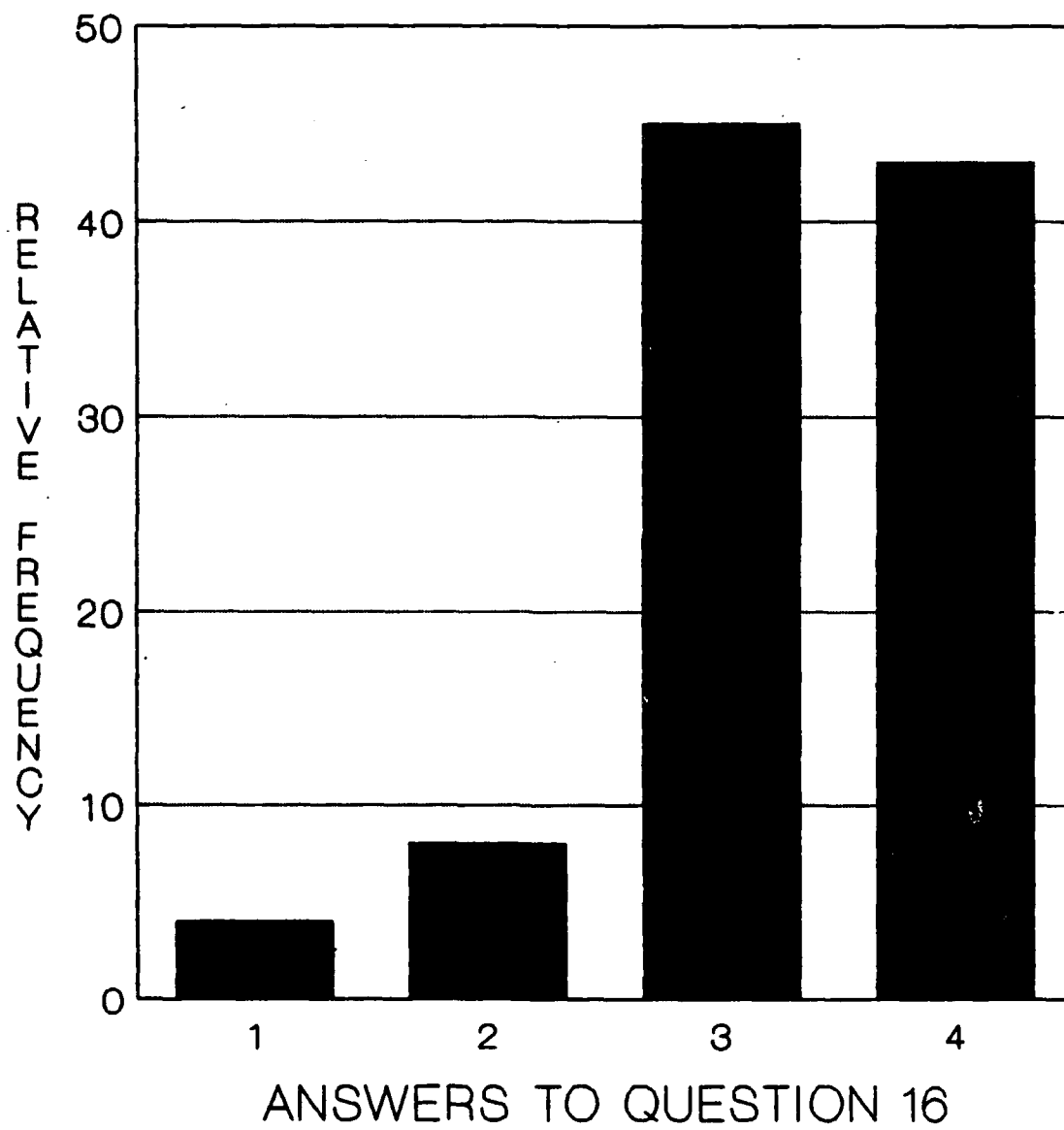


Figure 18. Selection Rates for Question 16

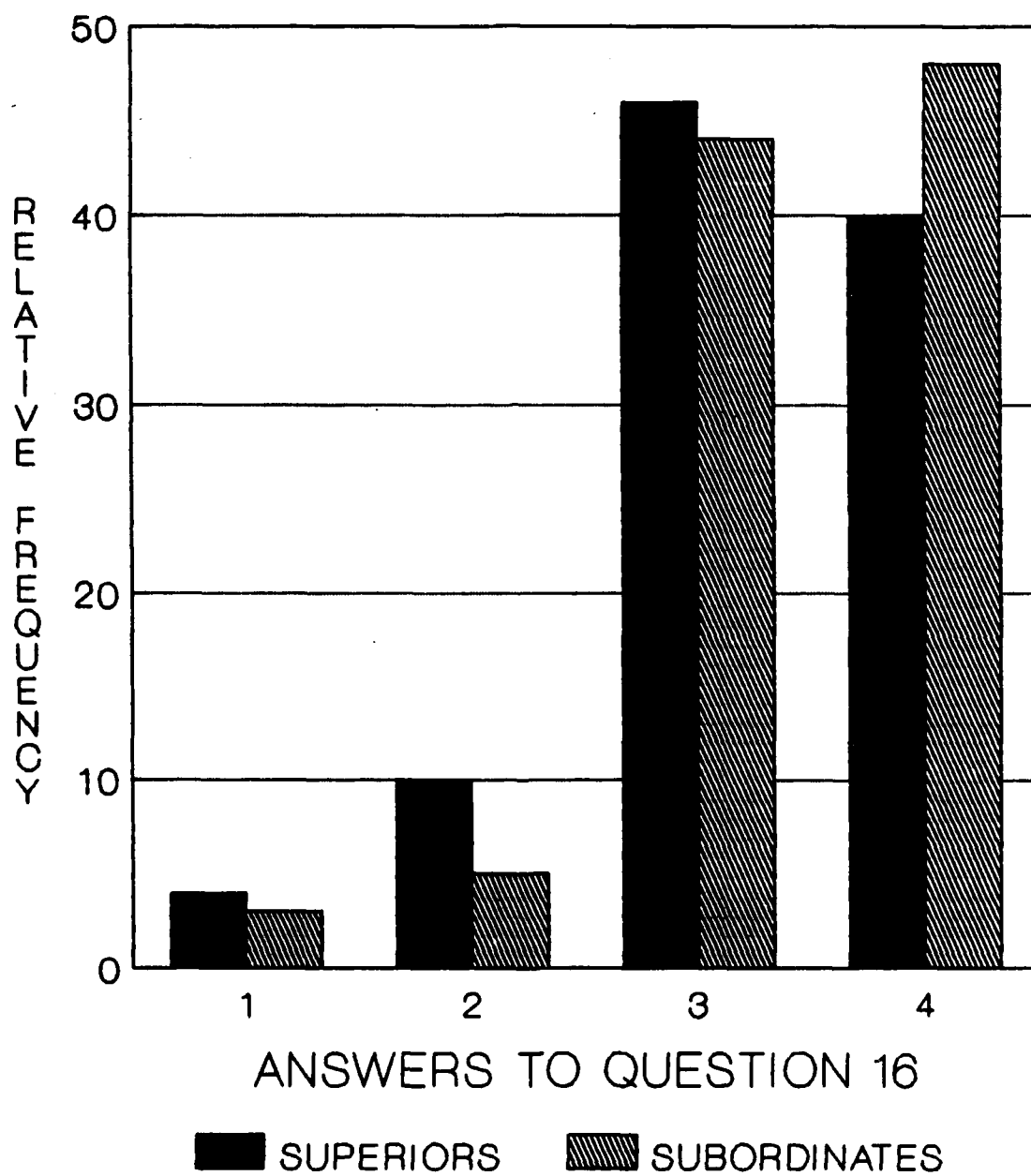


Figure 19. Selection Rates for Question 16
(By Superior and Subordinate Subgroups)

them only 8 percent of the time. The preference was that maintenance officers only understand technical aspects of the job. It appears the respondents were almost equally divided on whether the maintenance officer should perform or understand the administrative part of the job. Overall, 45 percent said perform administrative and 43 percent said understand administrative. Similar results were seen in the two groups of superiors and subordinates.

Questions 62, 63, and 65. These questions asked the respondents to rank the best, worst, and ideal maintenance officer on a scale from one being highly technically oriented to 5 being highly administratively oriented. Table 15 lists the mean responses for each question.

TABLE 15
MEANS FOR QUESTIONS 62, 63, AND 65

QUESTION NUMBER/CONTENT	ALL	SUPERIORS	SUBORDINATES
#62 Best Maintenance Officer	2.7	2.6	2.9
#63 Worst Maintenance Officer	3.8	3.8	3.9
#65 Ideal Maintenance Officer	2.8	2.7	2.9

Questions 62 and 63 were included in the survey to determine what qualities the supervisors felt the best and worst maintenance officers in the field possessed.

Interestingly, there was no difference between the opinions of the superiors and subordinates. This was confirmed by performing a two-tailed z-test for each question. In each case, there was not a significant difference between the groups at a 95 percent confidence level.

Figure 20 presents the responses to Question 62, while Figure 21 shows the answers to Question 63. The best maintenance officers were viewed as equally technically and administratively oriented. However, there was also a slight preference for technical skills over administrative talents. The responses to Question 63 show the worst maintenance officers tended to be either strongly technically or strongly administratively oriented. The strong administratively skilled officers were judged to be less effective than those possessing strong technical skills. These results lead to the conclusion that the best maintenance officer is almost equally capable in technical and administrative matters. Those officers who tend to concentrate on only one skill or the other are viewed as poor maintenance managers. Also, the administrative skills do not appear to be quite as valued as technical ability.

Question 65 was included in the survey to directly ask the respondents whether they preferred a more technical or administrative maintenance officer. The intent behind this question was to see if this answer would match the answer determined indirectly from the rest of the survey. Figure

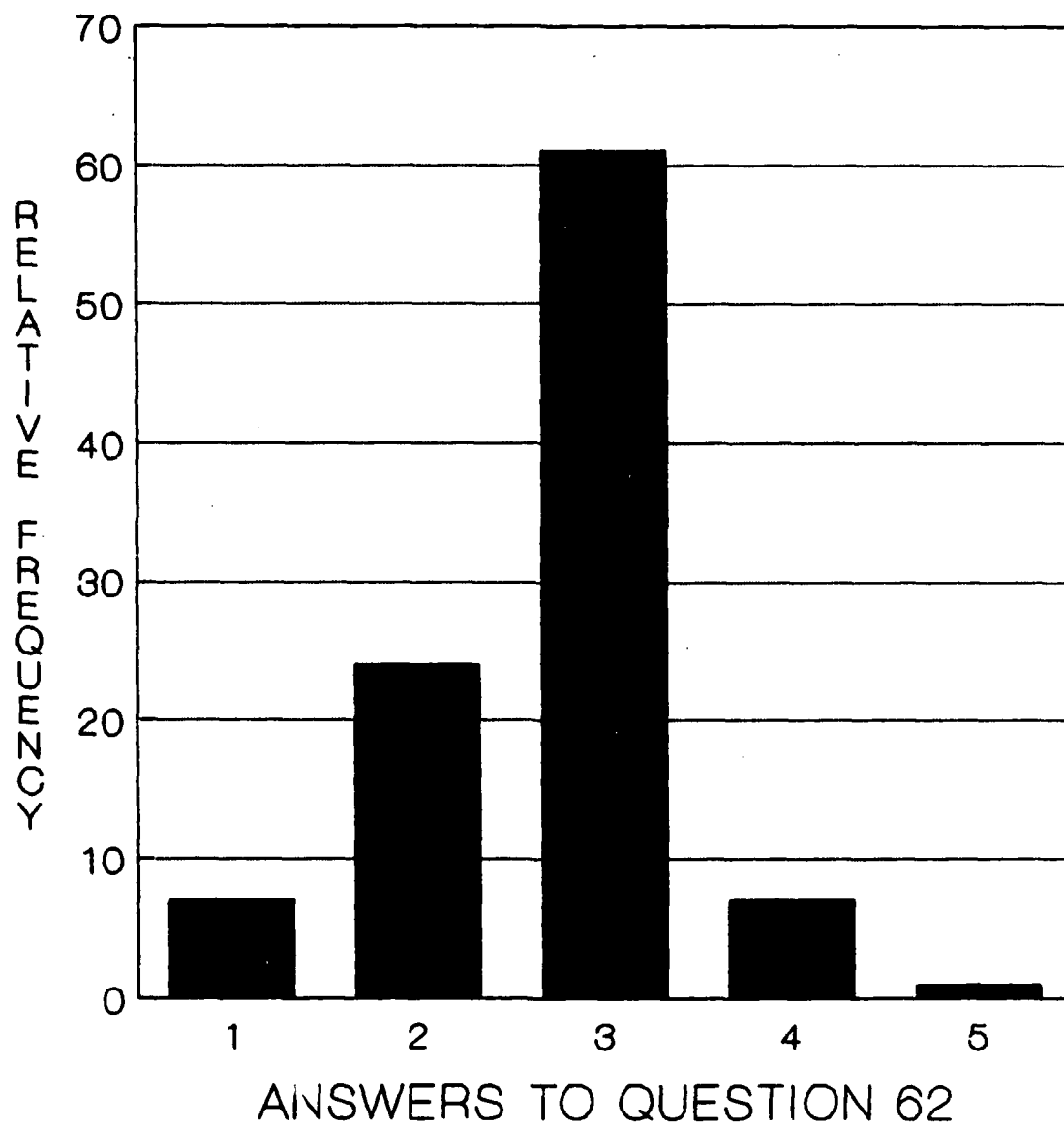


Figure 20. Best Maintenance Officer

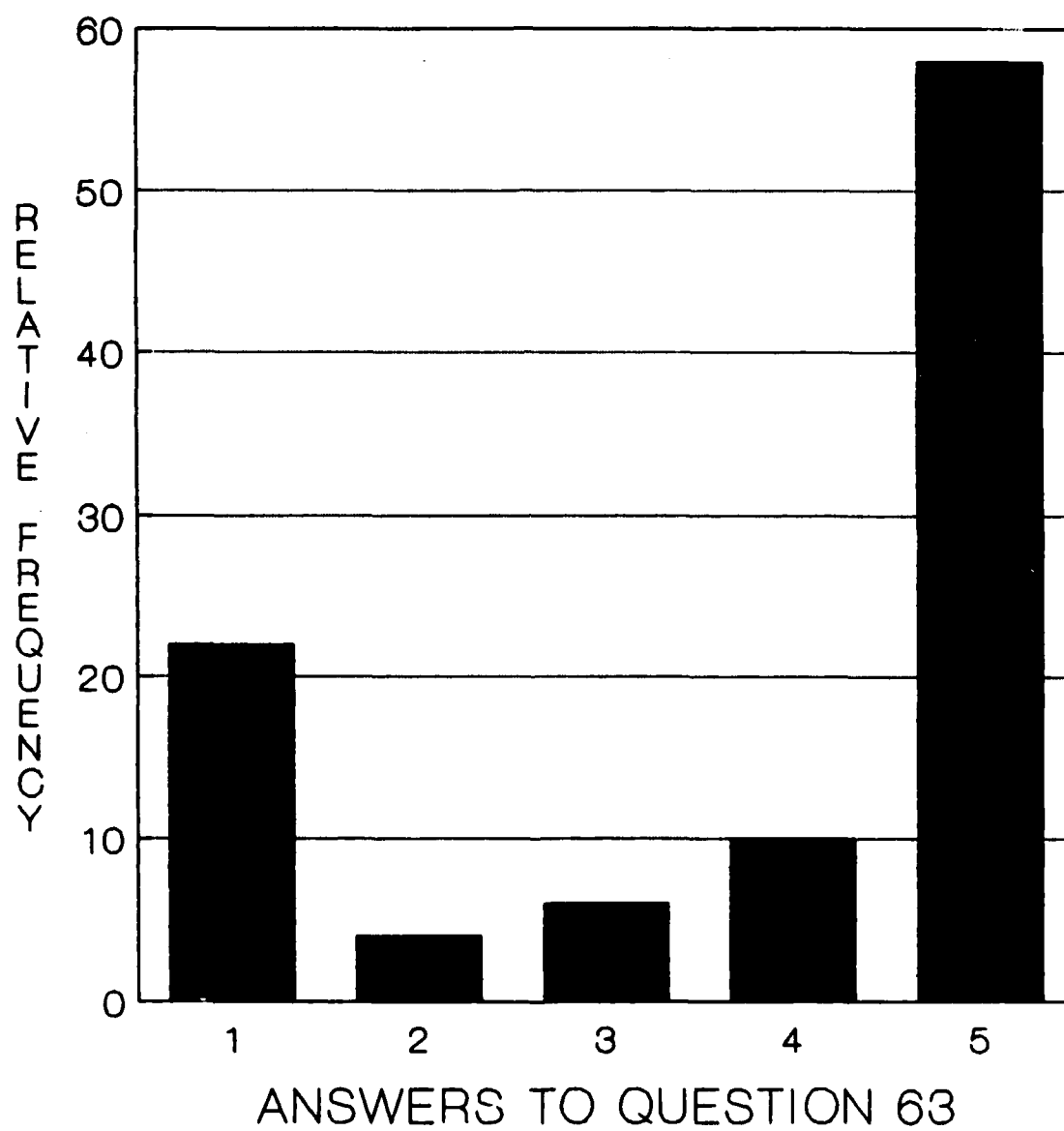


Figure 21. Worst Maintenance Officer

22 shows the responses to this question. It clearly indicates the majority of respondents preferred a maintenance officer to be equally skilled in both technical and administrative duties with a slight preference for technical skills over administrative abilities. This answer does match the results obtained from the rest of the survey, which indicated that overall TAC maintenance supervisors prefer a slightly more technically oriented aircraft maintenance officer.

Rated versus Non-rated Maintenance Supervisors. When reviewing the returned surveys, it was noted that only 5 percent of the Maintenance Supervisors held an aeronautical rating while 45 percent of the Squadron Commander and 42 percent of the DCMs were rated. Since there was such a large difference between the percentage of rated officers in these positions, it was decided to do an additional analysis to compare the responses of rated and non-rated officers. The question that arose was whether the rated and non-rated officers held different opinions in regards to the skills a maintenance officer should possess.

Data from the DCM and Squadron Commander subgroups was used to answer the question. The two groups were used because they showed agreement in their overall responses to the survey. The Maintenance Supervisor subgroup was not included in the sample because their responses varied from the DCM group and they had so few rated individuals.

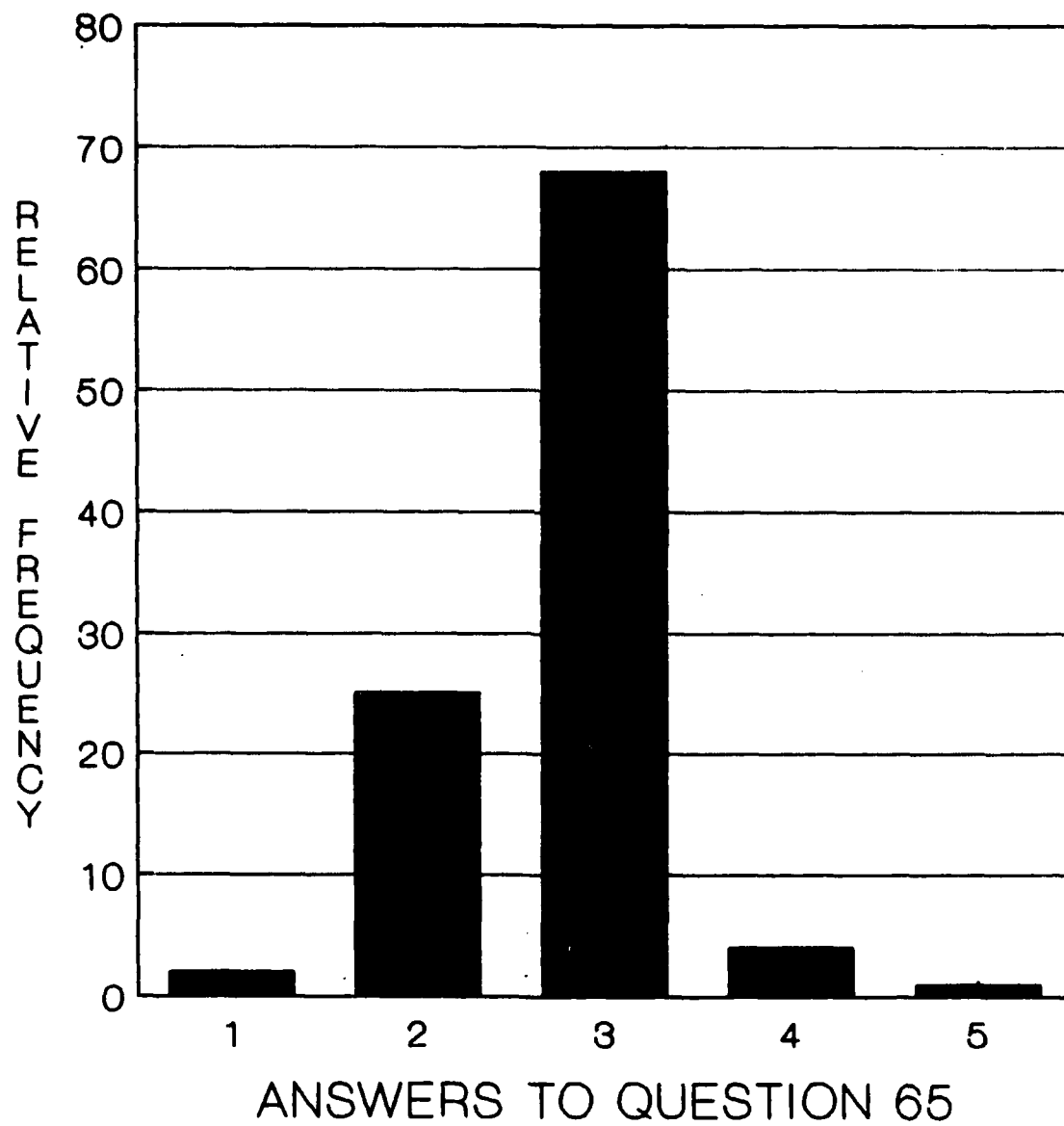


Figure 22. Ideal Maintenance Officer

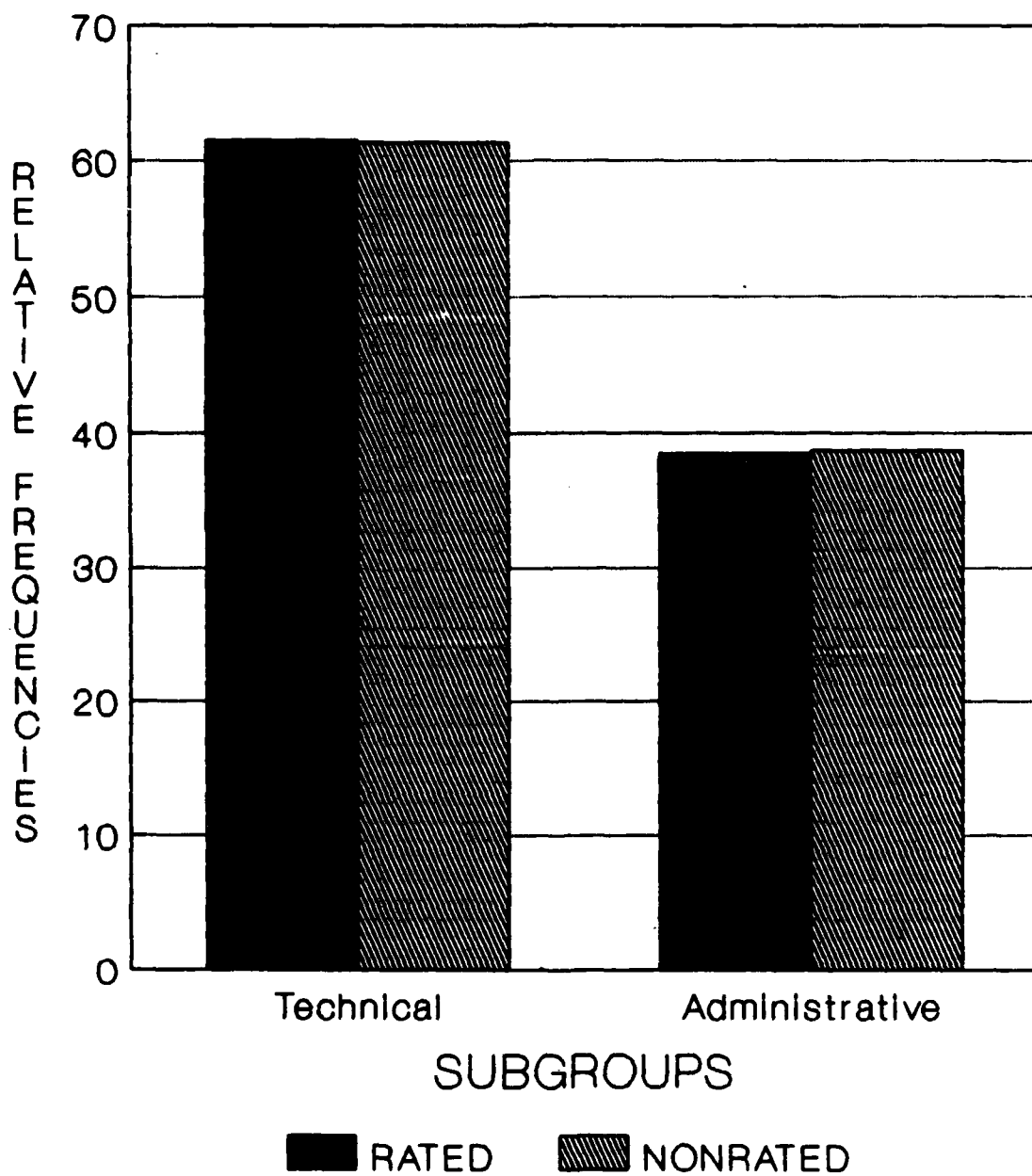


Figure 23. Selection Rates for Rated and Non-rated Officers (Squadron Commanders and DCMs)

Therefore, this group was not included in the sample. The rated group had 32 respondents and the non rated group had 42 people in it.

As can be seen on the previous page in Figure 23, there was virtually no difference in the selection rate of technical and administrative skills between the two groups. Performing statistical testing on the data confirmed there was no difference. These results indicate that holding an aeronautical rating did not seem to have a bearing on the respondents answers.

Summary

This chapter presented the results of the research into whether TAC wing level maintenance supervisors prefer branch level maintenance officers to be more technically or administratively oriented. Chapter 5, which follows, will offer a summary of the conclusions reached as a result of the investigation. Also included will be recommendations for future study.

V. Summary and Recommendations

Introduction

This chapter first presents a summary of the findings of the research effort to determine if TAC wing level maintenance supervisors prefer branch level maintenance officers to be more administratively or technically oriented. Addressed after that is how this research supported related investigative work done previously. Overall conclusions will then be presented and the chapter will conclude with recommendations and ideas for future research.

Summary of Research

Analysis of Groups. Table 16 presents a summation of the preferences stated by the various groups analyzed in this study.

TABLE 16
PREFERENCE INDICATED BY GROUP

GROUP	PREFERENCE
DCM	TECHNICAL
SQUADRON COMMANDER	TECHNICAL
MAINTENANCE SUPERVISOR	TECHNICAL
MAINTENANCE SUPERINTENDENT	NONE
BRANCH CHIEF	NONE
SHOP CHIEF	NONE

Table 17 is a list of the various groups showing which exhibited no significant difference in their stated preferences.

TABLE 17
COMPARISON OF GROUP PREFERENCES

GROUP	GROUPS SHOWING NO DIFFERENCE IN PREFERENCES
DCM	SQUADRON COMMANDER
SQUADRON COMMANDER	DCM, MAINTENANCE SUPERVISOR
MAINTENANCE SUPERVISOR	SQUADRON COMMANDER
MAINTENANCE SUPERINTENDENT	BRANCH CHIEF, SHOP CHIEF
BRANCH CHIEF	MAINTENANCE SUPERINTENDENT, SHOP CHIEF
SHOP CHIEF	MAINTENANCE SUPERINTENDENT, BRANCH CHIEF

These two tables together represent some of the primary information gathered in this research. Based on these findings, it can be seen that this research effort supported previous work in the area of perceptions of effective behavior. As predicted, different groups did hold distinct preferences for the two primary skills maintenance officers need to possess to be effective. Also supported was research showing that groups further apart in the organizational hierarchy tend to have more divergent opinions as to what constitutes effective performance.

The selection rates of technical and administrative skills in the survey represented the feelings each group had concerning what constitutes a effective maintenance officer. Different selection rates were not always distinctly seen between the six individual subgroups, but were definitely observed between the subordinate and superior groups. It appears the position held was not as critical as whether an individual was in the superior or subordinate group. On a whole, the superior subgroup preferred maintenance officers to possess technical skills over administrative abilities. The subordinate group expressed no distinct preference for technical or administrative skills.

This research also showed that when two groups were further apart in the chain of command, there was a greater difference in their opinions. When considering all six groups, one of the largest differences was observed between the Shop Chief and the DCM subgroups. This variance in opinion was also seen within the superior group itself. The two groups furthest apart, the DCMs and the Maintenance Supervisors, held significantly different opinions with the DCMs having a much stronger preference for technical skills.

Overall Conclusions. There are several conclusions that can be drawn from this research. First, a general statement can be made concerning the preference expressed by all of the maintenance supervisors. Second, differences between certain groups can be pointed out. Lastly,

conclusions can be made concerning the different subgroups studied.

Overall, the TAC maintenance supervisors studied express a slight preference for technical skills over administrative talents. This overall outcome was a result of the commissioned officers responding with a definite preference for technical skills. The noncommissioned supervisors reported no preference for either technical or administrative abilities. However, when considered as one group, the result was a slight preference for technical skills.

Differences were primarily seen between the two main subgroups of subordinate and superior supervisors. Because it is critical to please both groups of supervisors, the maintenance officer is placed in a position of trying to balance the desires of both groups. This can be difficult if not impossible. Fortunately, there was not a great divergence between the two groups. However, there is a difference and it needs to be recognized.

The six subgroups studied were expected to show different results and in some cases this was seen. However, the data studied indicated the greater differentiation of opinions occurred between the officers and enlisted managers, not the individual subgroups within these groups. Only minor differences were seen within the two major groups. This leads to the conclusion that the position held

has less effect on the opinion expressed than the commissioned status of the respondent.

Recommendations

The data gathered and analyzed in this research should be corroborated by further studies. Confirmation of these results will strengthen the value of the information. Since the aircraft maintenance officer is being asked to satisfy two different groups of supervisors, it is essential that all involved understand what skills are preferred.

This study showed the superiors and subordinates of the maintenance officer each prefer the officer to possess different skills. It is difficult to please both groups simultaneously. Not only does the maintenance officer need to know what is expected, but the supervisors also need this information. There needs to be agreement between the superior and subordinate groups as to what constitutes effective performance. The first step in coming to an agreement is to understand the position of each group and to see where the differences and similarities exist. This research is the first phase in the process of reaching that understanding.

Recommended Future Research

There are three areas of recommended research to follow on to this effort. The first effort would be a duplication of this work. Another area to explore would be surveying

the branch level maintenance officer. A last recommendation is to compare these results with results from MAC and SAC.

The first effort of duplicating this work would add to the validity of the information gathered during this study. The same survey instrument could be used with modifications made to eliminate some of the problems identified. The major difficulty with the survey was the fact that there were different levels of technical and administrative skills addressed. The various questions of the survey could be reorganized to group similar skill levels together. This would allow the respondents to more accurately express their preferences for administrative and technical skills.

Administering this same survey to a sample of branch level maintenance officers would also provide interesting information. It would be very useful to know what the branch level maintenance officers feel are their primary duties. Alternately, the branch level maintenance officers could be asked to answer how they perceive their supervisors and subordinates would answer the survey. It would be fascinating to know if their opinions match the actual preferences of the two groups.

Finally, these results could be compared against the findings of similar research being done in MAC and SAC. This comparison would be useful to determine if there was a difference between commands or not. If there was no difference between commands, this could indicate the issue

was worth investigating at Air Force level. If there was a difference, this might prove useful in the assignment of personnel to the various commands.

Summary

This research was an effort to determine if TAC wing maintenance supervisory personnel preferred a branch level maintenance officer to be more administratively or technically oriented. The findings suggest that a slightly more technically adept maintenance officer is preferred by the group as a whole. However, the research did identify differences between the preferences of the supervisors and subordinates of the maintenance officer. This finding indicates the need for additional research in this area. This study and follow on research could be useful in the management of aircraft maintenance, one of the most difficult and important jobs in the Air Force.

Appendix A: Survey

GENERAL INFORMATION

The purpose of this questionnaire is to obtain information about the characteristics of aircraft maintenance officers. Specifically, this information is being collected in support of research for a master's thesis by a student at the Air Force Institute of Technology (AFIT).

This survey does NOT require you to identify yourself by name. The background information required is general and anonymous. Please be assured that all information you provide will be held in the strictest confidence. Your individual responses will NOT be provided to management or to any other agency. Feedback on the study will be presented only in terms of averages describing what the "typical" response was. In addition, when the results of this study are published, readers will NOT be able to identify specific individuals or units.

Thank you for your cooperation in participating in this study. If you have any questions, please contact the researcher at the following address:

Captain Nancy E. Frye
AFIT School of Systems and Logistics
Wright-Patterson AFB, OH 45433
AUTOVON 785-4437

INSTRUCTIONS

This questionnaire contains 65 items (individual 'questions'). Answer all questions directly on the questionnaire. After you have completed the entire survey, transfer all answers to the answer sheet provided. Return both the questionnaire and the answer sheet. The questionnaire booklet is divided into eight sections. Sections 1, 2, 3, and 7 are in multiple choice format. You are to select only one answer in these sections.

In Section 4 you are asked to rank order items in groups of four or six. There is a space provided on the survey sheet where you are to write your selection. Here is a sample question:

Rank order the following activities, as you interpret them, from most enjoyable (1) to least enjoyable (4).

18. Pay income taxes	<u>3</u>
19. Cruise the Pacific Ocean	<u>2</u>
20. Visit your mother-in-law	<u>4</u>
21. Win a million dollars	<u>1</u>

In Section 5 you are given a five-point scale (1-5). Here is a sample:

1	2	3	4	5
Strongly agree	Slightly agree	Neither agree nor disagree	Slightly disagree	Strongly disagree

34. Maintenance officers should have blue eyes.	<u>3</u>
35. The best maintenance officers are left-handed.	<u>2</u>

In Section 6 you are to answer 1 if you feel the statement is important. If you feel the statement is not important, answer 2. Here is a sample:

Which duties should be performed by a maintenance officer?

44. Organize squadron picnics	<u>2</u>
45. Inspect aircraft	<u>1</u>

Section 8 contains a five-point scale similar to the one in Section 5. You are asked to rate persons along the following scale:

1	2	3	4	5
Highly technically oriented		Equally technically and administratively oriented		Highly adminis- tratively oriented

Here is a sample question:

58. Think of the best maintenance supervisor for whom you have worked. Where would that person fall on the scale? 2

(The person answering the sample question felt his best maintenance supervisor was more oriented toward technical areas than administrative areas. Therefore, he chose 2.)

All answers must be transferred to the machine-scored answer sheet by filling in the appropriate spaces. If for any question you do not find a response that fits your feelings exactly, use the one that is the closest to the way you feel.

Please use a 'soft-lead' (No. 2) pencil, and observe the following:

1. Make heavy black marks that fill in the space (of the response you select).
2. Erase cleanly any responses you wish to change.
3. Make no stray markings of any kind on the answer sheet.
4. Do not staple, fold, or tear the response sheet.
5. Darken only the answer portion of the response sheet. Do not fill in any other information on the response sheet.
6. Return both the questionnaire and the answer sheet.

Thank you for taking the time to complete the survey.

SECTION 1

BACKGROUND INFORMATION

This section of the survey contains several items dealing with personal characteristics. This information will be used to obtain a general picture of the background and experience of the person responding.

1. What is your current rank?
 1. Airman - TSgt
 2. MSgt - SMSgt
 3. CMSgt
 4. 2Lt - 1Lt
 5. Capt - Maj
 6. LtCol - Col
 7. Civilian
2. What position do you now hold?
 1. Shop Chief/Flight Chief
 2. Branch Chief/AMU NCOIC
 3. Maintenance Superintendent
 4. Maintenance Supervisor
 5. Squadron Commander
 6. DCM/Assistant DCM
3. How long have you been in the Air Force?
 1. Less than 5 years
 2. 5 years or more but less than 10 years
 3. 10 years or more but less than 15 years
 4. 15 years or more but less than 20 years
 5. 20 years or more but less than 25 years
 6. 25 years or more
4. How many years have you been in the aircraft maintenance field?
 1. Less than 3 years
 2. 3 years or more but less than 6 years
 3. 6 years or more but less than 9 years
 4. 9 years or more but less than 12 years
 5. 12 years or more

5. How many years have you spent in TAC?
1. Less than 3 years
 2. 3 years or more but less than 6 years
 3. 6 years or more but less than 9 years
 4. 9 years or more but less than 12 years
 5. 12 years or more
6. How long have you been in your present type of position?
Include all time spent in similar level jobs at different
bases or organizations within your present command.
1. Less than 6 months
 2. 6 months or more but less than 12 months
 3. 12 months or more but less than 18 months
 4. 18 months or more but less than 24 months
 5. 24 months or more but less than 36 months
 6. 36 months or more
7. Do you now hold or have you ever held an aeronautical rating?
1. Yes
 2. No
8. Which category best describes your status?
1. Enlisted
 2. Commissioned Officer with no prior enlisted time
 3. Commissioned Officer with under 4 years prior enlisted
time
 4. Commissioned Officer with 4 or more years prior enlisted
time
 5. Civilian

SECTION 2

In each of the following questions, you are given two activities. Select the activity you think is the more important of the two for the entry-level aircraft maintenance officer to perform.

- 9. 1. Ensuring availability of support equipment
 2. Knowing how to operate support equipment
- 10. 1. Understanding subordinates' training requirements
 2. Training subordinates
- 11. 1. Briefing safety requirements
 2. Performing safety inspections
- 12. 1. Learning technical issues of the aircraft system(s)
 2. Learning the administrative duties of the job
- 13. 1. Resolving personnel problems
 2. Resolving technical problems

SECTION 3

In the following set of questions, pick the one answer that best represents your feelings.

- 14. What should be the primary function of a maintenance officer when deployed TDY?
 - 1) Troubleshoot major aircraft system malfunctions
 - 2) Handle the paperwork requirements
 - 3) Supervise flight line work and determine maintenance work priorities
 - 4) Perform simple maintenance tasks (ie. marshalling, refueling, etc.)
 - 5) Schedule duty hours for maintenance personnel
 - 6) Act as figurehead without actually getting involved

15. On which one of the following should the maintenance officer concentrate supervisory checks?

- 1) Completed maintenance actions
- 2) In-process maintenance actions
- 3) Reports and APRs
- 4) Personnel training currency
- 5) Launching aircraft
- 6) Appearance of personnel (AFR 35-10)

16. It is most important for the maintenance officer to:

- 1) Perform aircraft maintenance work and understand administrative work
- 2) Perform aircraft maintenance work and perform administrative work
- 3) Perform administrative work and understand aircraft maintenance work
- 4) Understand administrative work and understand aircraft maintenance work

SECTION 4

In the following four groups of questions, rank order the listed duties of an entry-level aircraft maintenance officer from what you feel is the most important (1) to the least important (4). Rank each group separately.

Group 1- Questions 17-20

- | | |
|--|------|
| 17. Troubleshoot aircraft maintenance problems | ---- |
| 18. Write/edit APRs, reports, etc. | ---- |
| 19. Schedule maintenance activities | ---- |
| 20. Attend meetings | ---- |

Group 2- Questions 21-24

- | | |
|---|------|
| 21. Perform Quality Assurance inspections on work | ---- |
| 22. Answer Quality Assurance reports | ---- |
| 23. Monitor training status | ---- |
| 24. Ensure availability of proper tools and equipment | ---- |

Group 3- Questions 25-28

- | | |
|---------------------------------------|------|
| 25. Evaluate maintenance data reports | ---- |
| 26. Administer recognition programs | ---- |
| 27. Prepare assorted paperwork | ---- |
| 28. Perform simple maintenance tasks | ---- |

Group 4- Questions 29-32

- | | |
|--|------|
| 29. Direct maintenance activities | ---- |
| 30. Provide personal administrative expertise to superiors | ---- |
| 31. Provide personal technical expertise to superiors | ---- |
| 32. Direct administrative activities | ---- |

In the following questions, rank order the experiences/backgrounds of an entry-level maintenance officer from what you would most prefer (1) to what you would least prefer (6).

- | | |
|---|------|
| 33. Prior enlisted aircraft maintenance | ---- |
| 34. Prior enlisted aircrew member | ---- |
| 35. Prior enlisted other | ---- |
| 36. Prior officer aircrew member | ---- |
| 37. Officer cross trainee (non-aircrew) | ---- |
| 38. No prior experience necessary | ---- |

SECTION 5

This section of the questionnaire contains a number of statements describing the duties of an entry-level aircraft maintenance officer. Use the rating scale provided to show the extent to which you agree or disagree with the statements shown.

- | | 1 | 2 | 3 | 4 | 5 |
|-----|--|-------------------|-------------------------------|----------------------|----------------------|
| | Strongly
agree | Slightly
agree | Neither agree
nor disagree | Slightly
disagree | Strongly
disagree |
| 39. | A maintenance officer should concentrate on handling technical problems more than people problems. | | | | ---- |
| 40. | A maintenance officer should understand administrative procedures better than technical information (i.e. aircraft systems). | | | | ---- |
| 41. | A maintenance officer should spend more time supervising maintenance activities than doing paperwork. | | | | ---- |
| 42. | A maintenance officer should develop new maintenance techniques rather than develop new administrative policies. | | | | ---- |
| 43. | A maintenance officer should demonstrate technical competence by briefing aircraft status instead of speaking at ceremonial events (i.e. banquets, tours). | | | | ---- |
| 44. | A maintenance officer should concentrate on writing administrative reports (APRs, awards and decorations) instead of technical reports (QA reports, MOIs). | | | | ---- |
| 45. | A maintenance officer should handle people problems better than technical problems. | | | | ---- |
| 46. | The primary function of a maintenance officer is to look after the morale of personnel and handle duties like CFC instead of managing maintenance actions. | | | | ---- |
| 47. | A maintenance officer should be a contact point for flying operations and upper maintenance management instead of acting as a technical advisor to those people. | | | | ---- |
| 48. | A maintenance officer is principally responsible for maintenance activities instead of administrative activities. | | | | ---- |

SECTION 6

Maintenance officers have to meet certain requirements to be upgraded to the fully qualified AFSC. The following is a list of activities that may or may not be important for a maintenance officer to be capable of performing prior to upgrade. Mark (1) for those activities you feel are important and (2) for those activities you feel are not important for upgrade.

- 49. Operate support equipment (power units, light carts) -----
- 50. Perform simple maintenance tasks (marshalling, refueling) -----
- 51. Complete an academic technical course on the assigned weapon system -----
- 52. Complete a hands-on technical course on the assigned weapon system -----
- 53. Complete a supervisor's course -----
- 54. Complete an effective writing course -----
- 55. Be experienced at coordinating flight line launch activities -----
- 56. Understand and use the Technical Order system and relevant Technical Orders -----
- 57. Understand in detail how the supply system works -----
- 58. Have an in-depth knowledge of aircraft scheduling -----
- 59. Know how to properly document aircraft forms -----

SECTION 7

In the following set of questions, select the one answer that best represents your feelings.

60. What academic education produces better maintenance officers?
- 1) Administrative/ Business/ Management
 - 2) Engineering/ Science/ Technical
 - 3) Liberal Arts (Music, Art, History, etc.)
 - 4) Academic education is not important
61. Which of the following types of training is most important for a maintenance officer?
- 1) General aircraft systems course
 - 2) Report writing and briefing course
 - 3) In-depth technical training on the assigned weapon system
 - 4) Training on Air Force and Command Regulations
 - 5) Formal management training

SECTION 8

Using the rating scale provided, select the answer (1 to 5) that most closely represents your feelings about the abilities and characteristics of an entry-level maintenance officer. If you most strongly agree with the statement on the left, select (1). If you most strongly agree with the statement on the right, select (5).

1	2	3	4	5
Highly		Equally		Highly
technically		technically		adminis-
oriented		and		tratively
		administratively		oriented
		oriented		

62. Think of the best maintenance officer you have known.
Where would that person fall on the scale? -----
63. Think of the worst maintenance officer you have known.
Where would that person fall on the scale? -----
64. Think about the maintenance officer(s) with whom you
now work. (If you work with more than one, consider
the one who most stands out in your mind.) Where
would that person fall on the scale? -----
65. Finally, where do you feel the ideal maintenance
officer should fall on the scale? -----

Appendix B: Wings in Population

Air Force Base	Wing
Langley	1st TFW
Seymour-Johnson	4th TFW
England	23rd TFW
Homestead	31st TFW
Eglin	33rd TFW
Macdill	56th TTW
Moody	347th TFW
Myrtle Beach	354th TFW
Shaw	363rd TFW
Shaw	507th TACW
George	37th TFW
George	35th TTW
Luke	58th TTW
Luke	405th TTW
Holloman	49th TFW
Holloman	479th TTW
Davis-Monthan	355th TTW
Davis-Monthan	602nd TACS
Cannon	27th TFW
Bergstrom	67th TRW
Mountain Home	366th TFW
Hill	388th TFW
Nellis	474th TFW

Appendix C: Random Samples

Deputy Commander for Maintenance Sample
(Comprised of all DCMs and Assistant DCMs)

Air Force Base	Wing
Langley	1st TFW
Seymour-Johnson	4th TFW
England	23rd TFW
Homestead	31st TFW
Eglin	33rd TFW
Macdill	56th TTW
Moody	347th TFW
Myrtle Beach	354th TFW
Shaw	363rd TFW
Shaw	507th TACW
George	37th TFW
George	35th TTW
Luke	58th TTW
Luke	405th TTW
Holloman	49th TFW
Holloman	479th TTW
Davis-Monthan	355th TTW
Davis-Monthan	602nd TACS
Cannon	27th TFW
Bergstrom	67th TRW
Mountain Home	366th TFW
Hill	388th TFW
Nellis	474th TFW

Squadron Commander Sample

Air Force Base	Wing	Squadron
Langley	1st TFW	AGS
Langley	1st TFW	EMS
Langley	1st TFW	CRS
Seymour-Johnson	4th TFW	AGS
Seymour-Johnson	4th TFW	EMS
Seymour-Johnson	4th TFW	CRS
England	23rd TFW	AGS
England	23rd TFW	EMS
England	23rd TFW	CRS
Homestead	31st TFW	AGS
Homestead	31st TFW	EMS
Homestead	31st TFW	CRS
Eglin	33rd TFW	AGS
Eglin	33rd TFW	EMS
Eglin	33rd TFW	CRS
Macdill	56th TTW	AGS
Macdill	56th TTW	EMS
Moody	347th TFW	EMS
Moody	347th TFW	CRS
Myrtle Beach	354th TFW	EMS
Myrtle Beach	354th TFW	CRS
Shaw	363rd TFW	EMS
Shaw	363rd TFW	CRS
Shaw	507th TACW	AGS
Shaw	507th TACW	EMS
George	37th TFW	AGS
George	37th TFW	EMS
George	37th TFW	CRS
Luke	58th TTW	EMS
Luke	405th TTW	AGS
Luke	405th TTW	CRS
Holloman	49th TFW	AGS
Holloman	49th TFW	EMS
Holloman	49th TFW	CRS
Holloman	479th TTW	AGS
Holloman	479th TTW	EMS
Davis-Monthan	355th TTW	AGS
Davis-Monthan	355th TTW	EMS
Davis-Monthan	602nd TACS	AGS
Cannon	27th TFW	AGS
Cannon	27th TFW	EMS
Cannon	27th TFW	CRS
Bergstrom	67th TRW	AGS
Bergstrom	67th TRW	EMS
Bergstrom	67th TRW	CRS
Mountain Home	366th TFW	CRS
Hill	388th TFW	EMS
Hill	388th TFW	CRS
Nellis	474th TFW	EMS
Nellis	474th TFW	CRS

Maintenance Supervisor Sample

Air Force Base	Wing	Squadron
Langley	1st TFW	EMS
Seymour-Johnson	4th TFW	AGS
Seymour-Johnson	4th TFW	CRS
England	23rd TFW	AGS
England	23rd TFW	EMS
England	23rd TFW	CRS
Homestead	31st TFW	AGS
Homestead	31st TFW	EMS
Eglin	33rd TFW	AGS
Eglin	33rd TFW	EMS
Macdill	56th TTW	AGS
Macdill	56th TTW	CRS
Moody	347th TFW	AGS
Myrtle Beach	354th TFW	AGS
Myrtle Beach	354th TFW	EMS
Myrtle Beach	354th TFW	CRS
Shaw	363rd TFW	AGS
Shaw	363rd TFW	CRS
Shaw	507th TACW	EMS
Shaw	507th TACW	CRS
George	37th TFW	AGS
George	37th TFW	CRS
George	35th TTW	EMS
George	35th TTW	CRS
Luke	58th TTW	EMS
Luke	58th TTW	CRS
Luke	405th TTW	AGS
Luke	405th TTW	EMS
Luke	405th TTW	CRS
Holloman	49th TFW	AGS
Holloman	49th TFW	CRS
Holloman	479th TTW	EMS
Holloman	479th TTW	CRS
Davis-Monthan	355th TTW	AGS
Davis-Monthan	355th TTW	EMS
Davis-Monthan	602nd TACS	AGS
Davis-Monthan	602nd TACS	CRS
Cannon	27th TFW	AGS
Cannon	27th TFW	CRS
Bergstrom	67th TRW	EMS
Mountain Home	366th TFW	AGS
Mountain Home	366th TFW	EMS
Mountain Home	366th TFW	CRS
Hill	388th TFW	AGS
Hill	388th TFW	EMS
Hill	388th TFW	CRS
Nellis	474th TFW	AGS
Nellis	474th TFW	EMS
Nellis	474th TFW	CRS

Maintenance Superintendent Sample

Air Force Base	Wing	Squadron
Langley	1st TFW	AGS
Langley	1st TFW	EMS
Seymour-Johnson	4th TFW	AGS
Seymour-Johnson	4th TFW	EMS
Seymour-Johnson	4th TFW	CRS
England	23rd TFW	AGS
England	23rd TFW	EMS
Homestead	31st TFW	EMS
Homestead	31st TFW	CRS
Eglin	33rd TFW	AGS
Eglin	33rd TFW	EMS
Eglin	33rd TFW	CRS
Macdill	56th TTW	AGS
Macdill	56th TTW	EMS
Moody	347th TFW	EMS
Moody	347th TFW	CRS
Myrtle Beach	354th TFW	AGS
Myrtle Beach	354th TFW	EMS
Shaw	363rd TFW	EMS
Shaw	363rd TFW	CRS
Shaw	507th TACW	CRS
George	37th TFW	CRS
George	35th TTW	AGS
George	35th TTW	EMS
George	35th TTW	CRS
Luke	58th TTW	EMS
Luke	58th TTW	CRS
Luke	405th TTW	AGS
Luke	405th TTW	EMS
Luke	405th TTW	CRS
Holloman	49th TFW	EMS
Holloman	479th TTW	AGS
Holloman	479th TTW	EMS
Holloman	479th TTW	CRS
Davis-Monthan	355th TTW	AGS
Davis-Monthan	355th TTW	EMS
Davis-Monthan	355th TTW	CRS
Davis-Monthan	602nd TACS	EMS
Davis-Monthan	602nd TACS	CRS
Cannon	27th TFW	AGS
Cannon	27th TFW	EMS
Mountain Home	366th TFW	AGS
Mountain Home	366th TFW	EMS
Mountain Home	366th TFW	CRS
Hill	388th TFW	EMS
Hill	388th TFW	CRS
Nellis	474th TFW	AGS
Nellis	474th TFW	EMS
Nellis	474th TFW	CRS

Branch Chief Sample

Air Force Base	Wing	Branch
Langley	1st TFW	94th AMU NCOIC
Langley	1st TFW	MAINTENANCE BRANCH
Seymour-Johnson	4th TFW	MAINTENANCE BRANCH
Seymour-Johnson	4th TFW	355th AMU NCOIC
England	23rd TFW	ACCESSORY
Eglin	33rd TFW	60th AMU PRODUCTION SUPER
Eglin	33rd TFW	59th AMU NCOIC
Eglin	33rd TFW	58th AMU NCOIC
Eglin	33rd TFW	FABRICATION
Macdill	56th TFW	62nd AMU PRODUCTION SUPER
Macdill	56th TFW	63rd AMU PRODUCTION SUPER
Macdill	56th TFW	CONVENTIONAL AVIONICS
Moody	347th TFW	MAINTENANCE
Myrtle Beach	354th TFW	AEROSPACE GROUND EQUIP
Myrtle Beach	354th TFW	PROPULSION
Myrtle Beach	354th TFW	355th AMU PRODUCTION SUPER
Shaw	363rd TFW	CONVENTIONAL AVIONICS
Shaw	363rd TFW	21st AMU PRODUCTION SUPER
Shaw	507th TACW	CONVENTIONAL AVIONICS
Shaw	507th TACW	AEROSPACE GROUND EQUIP
Shaw	507th TACW	703rd AMU NCOIC
George	37th TFW	MAINTENANCE
George	37th TFW	561st AMU NCOIC
George	35th TFW	AEROSPACE GROUND EQUIP
Luke	58th TFW	312th AMU PRODUCTION SUPER
Luke	58th TFW	TMDE
Luke	58th TFW	FABRICATION
Luke	405th TFW	461st AMU NCOIC
Luke	405th TFW	461st AMU PRODUCTION SUPER
Luke	405th TFW	426th AMU NCOIC
Holloman	49th TFW	ACCESSORY
Holloman	49th TFW	7th AMU PRODUCTION SUPER
Holloman	479th TFW	INTEGRATED AVIONICS
Davis-Monthan	355th TFW	TMDE
Davis-Monthan	602nd TACS	23rd AMU PRODUCTION SUPER
Davis-Monthan	602nd TACS	PROPULSION
Cannon	27th TFW	PROPULSION
Cannon	27th TFW	522nd AMU PRODUCTION SUPER
Cannon	27th TFW	FABRICATION
Bergstrom	67th TRW	45th AMU PRODUCTION SUPER
Bergstrom	67th TRW	AEROSPACE GROUND EQUIP
Mountain Home	366th TFW	CONVENTIONAL AVIONICS
Mountain Home	366th TFW	391st AMU PRODUCTION SUPER
Mountain Home	366th TFW	MAINTENANCE
Mountain Home	366th TFW	390th AMU NCOIC
Hill	388th TFW	4th AMU PRODUCTION SUPER
Hill	388th TFW	FABRICATION
Hill	388th TFW	ACCESSORY
Nellis	474th TFW	MAINTENANCE
Nellis	474th TFW	429th AMU NCOIC

Shop Chief Sample

Air Force Base	Wing	Shop
England	23rd TFW	METAL PROCESSING
Eglin	33rd TFW	CORROSION CONTROL
Eglin	33rd TFW	STRUCTURAL REPAIR
Eglin	33rd TFW	AGE DELIVERY
Macdill	56th TTW	62nd AMU B FLIGHT CHIEF
Macdill	56th TTW	TEST CELL
Moody	347th TFW	AGE INSPECTION
Moody	347th TFW	ENVIRONMENTAL SYSTEMS
Myrtle Beach	354th TFW	AUTOMATIC TEST STATIONS
Myrtle Beach	354th TFW	CORROSION CONTROL
Myrtle Beach	354th TFW	ELECTRONIC WARFARE
Shaw	363rd TFW	ELECTRONIC WARFARE TEST
Shaw	363rd TFW	CORROSION CONTROL
Shaw	363rd TFW	AGE DELIVERY
Shaw	363rd TFW	REPAIR AND RECLAMATION
Shaw	363RD TFW	STRUCTURAL REPAIR
Shaw	507th TACW	STRUCTURAL REPAIR
George	37th TFW	562nd AMU B FLIGHT CHIEF
George	37th TFW	EGRESS
George	37th TFW	ACCESSORY/MODULE
George	35th TTW	WEAPONS CONTROL
Luke	58th TTW	310th AMU SPECIALIST FLT
Luke	58th TTW	METAL PROCESSING
Luke	58th TTW	WEAPONS CONTROL
Luke	58th TTW	312th AMU A FLIGHT CHIEF
Luke	405th TTW	AVIONICS SUPPORT EQUIPMENT
Luke	405th TTW	JET ENGINE
Luke	405th TTW	AGE DELIVERY
Holloman	49th TFW	TURBO PROP
Holloman	49th TFW	JET ENGINE
Holloman	479th TTW	REPAIR AND RECLAMATION
Holloman	479th TTW	AGE INSPECTION
Holloman	479th TTW	433rd AMU SPECIALIST FLT
Davis-Monthan	355th TTW	GAS TURBINE ENGINE
Davis-Monthan	355th TTW	TEST CELL
Davis-Monthan	355th TTW	REPAIR AND RECLAMATION
Davis-Monthan	602nd TACS	AUTOMATIC TEST STATIONS
Davis-Monthan	602nd TACS	MANUAL TEST STATIONS
Cannon	27th TFW	MACHINE
Cannon	27th TFW	NON DESTRUCTIVE INSPECTION
Bergstrom	67th TRW	TEST CELL
Bergstrom	67th TRW	45th AMU B FLIGHT CHIEF
Bergstrom	67th TRW	GAS TURBINE ENGINE
Mountain Home	366th TFW	JET ENGINE
Mountain Home	366th TFW	391st AMU A FLIGHT CHIEF
Mountain Home	366th TFW	391st AMU B FLIGHT CHIEF
Hill	388th TFW	ELECTRONIC WARFARE TEST
Nellis	474th TFW	AGE INSPECTION
Nellis	474th TFW	AIRCRAFT INSPECTION

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→ This study examined whether wing level maintenance supervisory personnel in Tactical Air Command (TAC) preferred branch level maintenance officers to be more administratively or technically oriented. The wing level maintenance supervisors studied included six groups. These groups were Deputy Commanders for Maintenance, Squadron Commanders, Maintenance Supervisors, Maintenance Superintendents, Branch Chiefs, and Shop Chiefs.

~ A survey was developed expressly for this investigation. Three main investigative questions were addressed. First, each of the six different groups of respondents were studied individually to determine what skills each preferred. Second, the superior and subordinate subgroupings were examined to identify any preferences for technical or administrative talents. Lastly, all responses were analyzed together to see what talents TAC maintenance supervisors preferred overall.

Analysis of the responses indicated the Deputy Commanders for Maintenance held the strongest opinions and definitely preferred maintenance officers to possess technical skills. The Squadron Commanders and Maintenance Supervisors also preferred technical over administrative skills. No preference for either technical or administrative abilities was expressed by the Maintenance Superintendents, Branch Chiefs, or Shop Chiefs.

Examination of each of the two main subgroups showed the subordinate group preferred both skills equally, while the superior group exhibited a clear preference for technical skills. When all responses were analyzed together, the overall results indicated that TAC wing level maintenance supervisory personnel prefer the branch level maintenance officer to be more technically than administratively adept.

→ The results of this study supported previous work in the area of perceptions of managerial effectiveness throughout an organization. This and previous research showed that different groups within an organization will have different perceptions of effective managerial behavior. Additionally, groups further apart in the organization will tend to show more divergent attitudes. These (SBC) 7